

IL-2 Series of Flight Simulations

Il-2 Sturmovik
Forgotten Battles
Ace Expansion Pack
Pacific Fighters
Pe-2 Peshka
Sturmoviks over Manchuria
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FLYABLE AIRCRAFT GUIDE

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Allied Aircraft

(some aircraft served on both sides, but appear only in one of the lists)

A-20C	Il-2 Type 3	P-39N	Spitfire LF Mk Vc4
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B-25J-1NA	Il-2I	P-39Q-1	Spitfire Mk IXc
Beaufighter Mk 21	Il-2M 1942 1 Series	P-39Q-10	Spitfire Mk IXe
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Corsair Mk I	La-5F	P-40E	Spitfire Mk VIII CW
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F4U-1A	LaGG-3, 1941 4 Series	P-47D-22	Tomahawk IIb
F4U-1C	LaGG-3, 1942 29 Series	P-47D-27	Tomahawk IIc
F4U-1D	LaGG-3, 1942 35 Series	P-51B-NA	Tomahawk Mk IIa
F6F-3 Late Ext	LaGG-3, 1943 66 Series	P-51C-NT	Tomahawk Mk IIb
F6F-5	LaGG-3IT	P-51D-20NA	Yak-1
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Hawk 81A-2	MiG-3 2xShVAK	P-63C-5	Yak-1B
Hurricane Mk II field mod	MiG-3 2xUB	Pe-2 1 series	Yak-3
Hurricane Mk IIb	MiG-3 AM-38	Pe-2 110 series	Yak-3 VK-107
Hurricane Mk IIc	MiG-3	Pe-2 359 series	Yak-3P
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I-153P	MiG-3UD	Pe-3	Yak-7A
I-16 Tip 18	MiG-9 I-300	Pe-3bis	Yak-7B 1941
I-16 Type 24	MiG-9FS	SBD-3	Yak-7B 1942
I-16 Type 24 SPB	Mosquito	SBD-5	Yak-9
I-185 M-71	Mosquito FB MK VI	Seafire F MK III	Yak-9B
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I-250	P.11C	Spitfire HF Mk IXe	Yak-9K
IL-10	P-38J	Spitfire LF Mk IXc CW	Yak-9M
Il-2 1941 1 Series	P-38L	Spitfire LF Mk IXe CW	Yak-9T
Il-2 1941 2 Series	P-38L Late	Spitfire LF Mk Vb	Yak-9U
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Axis Aircraft

(some aircraft served on both sides, but appear only in one of the lists)

A6M2	Bf-109G-6AS	He-162A-2	Ki-43-II Kai
A6M2-21	Bf-109K-4	He-162B	Ki-61-I Hei
A6M2-N	Bf-109K-4 C3	He-162C	Ki-61-I Ko
A6M3	Bf-109Z	Lerche III B-2	Ki-61-I Otsu
A6M5	Bf-110G-2	Hurricane Mk I	Ki-84-Ia
A6M5a	D3A1	I.A.R. 80	Ki-84-Ib
A6M5b	Do-335A-0	I.A.R. 81a	Ki-84-Ic
A6M5c	Do-335V-13	I.A.R. 81c	MC.200 Serie 3
A6M7-62	Fiat CR.42	J2M3	MC.202 Serie III
A6M7-63	Fiat G.50	J2M5	MC.202 Serie VII
Ar-234B-2	FW-190 A-4	J8A (Gladiator)	MC.202 Serie XII
B-239	FW-190 A-5	Ju-87B-2	MC.205 V Serie I
Bf-109E-4	FW-190 A-5 1.65 ATA	Ju-87D-3	MC.205 V Serie III
Bf-109E-4B	FW-190 A-6	Ju-87D-5	Me-163B-1a
Bf-109E-7Z	FW-190 A-8	Ju-87G-1	Me-262A-1a
Bf-109eE-7B	FW-190 A-9	Ju-88A-4	Me-262A-1a U4
Bf-109F-2	FW-190 D-9 1944	Ki-100-I Ko	Me-262A-2a
Bf-109F-4	FW-190 D-9 1945	Ki-27 Ko	Me-262HG-II
Bf-109G-10	FW-190 F-8	Ki-27 Otsu	N1K2-Ja
Bf-109G-14	G4M1-11	Ki-43-Ia	Ta-152C
Bf-109G-2	Go-229A-1	Ki-43-Ib	Ta-152H-1
Bf-109G-6	He-111H-2	Ki-43-Ic	Ta-183
Bf-109G-6 Late	He-111H-6	Ki-43-II	

A-20C



Type: Bomber / Attack

Major Users: USA; USSR

Cockpit Guide:



- | | | | |
|----|------------------------------|----|--|
| 1 | Free Air Temperature | 16 | Oil Pressure (Engine #2) |
| 2 | Airspeed Indicator | 17 | Fuel Pressure (Engine #1) |
| 3 | Artificial Horizon | 18 | Fuel Pressure (Engine #2) |
| 4 | Variometer | 19 | Hydraulic Pressure |
| 5 | Manifold Pressure(Engine #1) | 20 | Gear & Flap Position Indicator |
| 6 | Manifold Pressure(Engine #2) | 21 | Oil Temperature (Engine #1) |
| 7 | Clock | 22 | Oil Temperature (Engine #2) |
| 8 | Altimeter | 23 | Carburetor Air Temperature (Engine #1) |
| 9 | Turn & Bank Indicator | 24 | Carburetor Air Temperature (Engine #2) |
| 10 | RPM Indicator (Engine #1) | 25 | Fuel Level |
| 11 | RPM Indicator (Engine #2) | 26 | Cylinder Head Temperature (Engine #1) |
| 12 | Compass | 27 | Cylinder Head Temperature (Engine #2) |
| 13 | Suction Gauge | 28 | Fuel Selector Switch |
| 14 | Compass | 29 | Oxygen Pressure |
| 15 | Oil Pressure (Engine #1) | 30 | Oxygen Quantity |

(A-20C continued)

Other Playable Crew Positions:



Bombardier



Bottom Gunner



Top Gunner

At a Glance:

Engine:

2 x R-2600-A5B

Power: 2 x 1,600 HP

Advantages:

- Long range;
- Powerful armament by early-war standards.

Armament:

- 6 x .50 cal machine guns (forward-firing)
- 3 x .50 cal machine guns (defensive)
- Up to 1,800 kg of bombs

Disadvantages:

- Poor defensive gun coverage.

Pilot Notes:

- The aircraft is equipped with a two-stage supercharger.
- Supercharger Stage 1 (default) should be used between 0 and 2,200 meters
- Supercharger Stage 2 should be used above 2,200 meters
- Mixture adjustment is automatic.

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Then the sight will automatically track the target, and drop the bombs automatically at the right time.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to acquire the target with the bombsight crosshair. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle up, and scan the horizon for the mission target.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course. Then using the *Increase Bombsight Distance* and *Decrease Bombsight Distance* keys place the crosshair on target. With the target dead center, turn on the targeting computer using the *Toggle Bombsight Automation* key. The bombsight will begin tracking the target. Correct the crosshair movement with the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys if necessary.
- The bombs will drop automatically when the plane reaches the proper position for a bomb drop, based on the input parameters and the optics angle.
- Note that after starting the bomb run, a plane may not be banked more than 4.5 degrees or the bombsight will lose stability. Only slight adjustments in direction are allowed. After more substantial maneuvers the bomb sight may take up to 30 seconds to stabilize. During the stabilization phase, the bomb sight crosshairs are turned off.

A-20G



Type: Ground Attack

Major Users: USA; USSR

Cockpit Guide:



- | | |
|--------------------------------|---|
| 1 Airspeed Indicator | 15 Fuel Pressure (Engine #2) |
| 2 Artificial Horizon | 16 Hydraulic Pressure |
| 3 Variometer | 17 Gear & Flap Position Indicator |
| 4 Manifold Pressure(Engine #1) | 18 Oil Temperature (Engine #1) |
| 5 Manifold Pressure(Engine #2) | 19 Oil Temperature (Engine #2) |
| 6 Altimeter | 20 Carburetor Air Temperature (Engine #1) |
| 7 Turn & Bank Indicator | 21 Carburetor Air Temperature (Engine #2) |
| 8 RPM Indicator (Engine #1) | 22 Fuel Level |
| 9 RPM Indicator (Engine #2) | 23 Cylinder Head Temperature (Engine #1) |
| 10 Compass | 24 Cylinder Head Temperature (Engine #2) |
| 11 Compass | 25 Fuel Selector Switch |
| 12 Oil Pressure (Engine #1) | 26 Oxygen Pressure |
| 13 Oil Pressure (Engine #2) | 27 Oxygen Quantity |
| 14 Fuel Pressure (Engine #1) | |

(A-20G continued)

Other Playable Crew Positions:



Bottom Gunner



Top Gunner

At a Glance:

Engine:

2 x R-2600-23

Power: 2 x 1,600 HP

Armament:

- 6 x .50-cal machine guns (nose)
- 3 x .50-cal machine guns (defensive)
- Up to 4,000 lbs of bombs

Advantages:

- Packs a powerful punch;
- Good armor protection and range.

Disadvantages:

- Heavy, not very maneuverable.

Pilot Notes:

- The aircraft is equipped with a two-stage supercharger.
- Supercharger Stage 1 (default) should be used between 0 and 2,200 meters
- Supercharger Stage 2 should be used above 2,200 meters
- Maximum traverse speed for the electric top turret is 60 deg / sec

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Then the sight will automatically track the target, and drop the bombs automatically at the right time.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to acquire the target with the bombsight crosshair. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle up, and scan the horizon for the mission target.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course. Then using the *Increase Bombsight Distance* and *Decrease Bombsight Distance* keys place the crosshair on target. With the target dead center, turn on the targeting computer using the *Toggle Bombsight Automation* key. The bombsight will begin tracking the target. Correct the crosshair movement with the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys if necessary.
- The bombs will drop automatically when the plane reaches the proper position for a bomb drop, based on the input parameters and the optics angle.
- Note that after starting the bomb run, a plane may not be banked more than 4.5 degrees or the bombsight will lose stability. Only slight adjustments in direction are allowed. After more substantial maneuvers the bomb sight may take up to 30 seconds to stabilize. During the stabilization phase, the bomb sight crosshairs are turned off.

B-25J-1NA



Type: Medium Bomber

Major Users: USA; USSR

Cockpit Guide:



- | | | | |
|----|-------------------------------------|----|---|
| 1 | Compass (not visible in screenshot) | 16 | Carburetor Air Temperature (Engine #1 & #2) |
| 2 | Pilot's Direction Indicator | 17 | Oil Temperature (Engine #1 & #2) |
| 3 | Radio Compass | 18 | Fuel Level (Front) |
| 4 | Compass | 19 | Flap Position Indicator |
| 5 | Manifold Pressure (Engine #1 & #2) | 20 | Hydraulic Pressure |
| 6 | RPM Indicator (Engine #1 & #2) | 21 | Altimeter |
| 7 | Suction Gauge | 22 | Turn & Bank Indicator |
| 8 | Fuel Pressure (Engine #1 & #2) | 23 | Variometer |
| 9 | Oil Pressure (Engine #1 & #2) | 24 | Pilot's Direction Indicator |
| 10 | Fuel Level (Auxiliary) | 25 | Cylinder Head Temperature (Engine #1 & #2) |
| 11 | Landing Gear Position Indicator | 26 | Free Air Temperature |
| 12 | Airspeed Indicator | 27 | Fuel Level (Rear) |
| 13 | Compass | 28 | Landing & Nav Light Switch |
| 14 | Artificial Horizon | 29 | Brake Pressure |
| 15 | Clock | | |

(B-25J continued)

Other Playable Crew Positions:



Bombardier



Nose Gunner



Top Turret Gunner



Waist Gunner (L – R)



Tail Gunner

At a Glance:

Engine:

2 x R-2600-29

Power: 2 x 1,700 HP

Armament:

- 12 x .50-cal machine guns
- Up to 1,814 kg of bombs

Advantages:

- Fast, maneuverable, durable.

Disadvantages:

- Relatively light bombload.

Pilot Notes:

- Switch supercharger speeds at 2,700 meters (8,850 feet)
- Maximum traverse speed for the electric top turret is 60 deg / sec

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Then the sight will automatically track the target, and drop the bombs automatically at the right time.
- As the first step, bombing altitude and airspeed must be entered. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to acquire the target with the bombsight crosshair. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle up, and scan the horizon for the mission target.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course. Then using the *Increase Bombsight Distance* and *Decrease Bombsight Distance* keys place the crosshair on target. With the target dead center, turn on the targeting computer using the *Toggle Bombsight Automation* key. The bombsight will begin tracking the target. Correct the crosshair movement with the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys if necessary.
- The bombs will drop automatically when the plane reaches the proper position for a bomb drop, based on the input parameters and the optics angle.
- Note that after starting the bomb run, a plane may not be banked more than 4.5 degrees or the bombsight will lose stability. Only slight adjustments in direction are allowed. After more substantial maneuvers the bomb sight may take up to 30 seconds to stabilize. During the stabilization phase, the bomb sight crosshairs are turned off.

Beaufighter Mk 21



Type: Fighter-Bomber

Major Users: RAF; RAAF; RNZAF

Cockpit Guide:



- | | | | |
|----|------------------------------|----|---------------------------------|
| 1 | Clock | 14 | RPM Indicator (Engine #2) |
| 2 | Airspeed Indicator | 15 | Fuel Pressure (Engine #1) |
| 3 | Artificial Horizon | 16 | Fuel Pressure (Engine #2) |
| 4 | Compass | 17 | Suction Gauge |
| 5 | Variometer | 18 | Coolant Temperature (Engine #1) |
| 6 | Altimeter | 19 | Coolant Temperature (Engine #2) |
| 7 | Turn & Bank Indicator | 20 | Oil Pressure (Engine #1) |
| 8 | Radio Altimeter | 21 | Oil Pressure (Engine #2) |
| 9 | Free Air Temperature | 22 | Oil Temperature (Engine #1) |
| 10 | Compass | 23 | Oil Temperature (Engine #2) |
| 11 | Manifold Pressure(Engine #1) | 24 | Hydraulic Systems Indicator |
| 12 | Manifold Pressure(Engine #2) | 25 | Fuel Level (Left) |
| 13 | RPM Indicator (Engine #1) | 26 | Fuel Level (Right) |

Other Crew Positions:

<not modeled>

Rear Observer

(Beaufighter continued)

At a Glance:

Engine:

2 x Hercules XVIII

Power: 2 x 1,725 HP

Armament:

- 4 x 20 mm cannon
- 4 x .50-cal machine guns
- Up to 2,000 lbs of bombs
- 8 x 90-lb rockets

Advantages:

- Very adaptable;
- Very powerful armament.

Disadvantages:

- Not maneuverable enough to evade enemy fighter;
- No defensive armament for the rear crewman.

Pilot Notes:

The Beaufighter Mk 21 is an Australian license-built version of the Beaufighter Mk X.

The plane is mostly intended as a ground attack aircraft or a torpedo bomber, however the very brave can also use it as a heavy fighter. Unfortunately it does not carry defensive armament, and the unarmed rear observer position is not modeled in the aircraft, so shaking off an enemy on one's tail is quite difficult.

The Beaufighter is very fast at low altitudes, and keeping that speed up is the key to survival.

BI-1



Type: Rocket Fighter

Major Users: USSR

Cockpit Guide:



- 1 **Airspeed Indicator**
- 2 **Ammeter**
- 3 **Altimeter**
- 4 **Turn & Bank Indicator**
- 5 **Oil & Air Pressure**

- 6 **Engine Status 1**
- 7 **Engine Status 2**
- 8 **Landing Gear Position Indicator**
- 9 **Fuel Level**

At a Glance:

Engine:

1 x LPR D-1-A-1100

Thrust: 1 x 1,100 kg/s

Armament:

2 x 20 mm guns ShVAK
(45 shells each)

Advantages:

- High speed and excellent climb rate;
- Easy controls;
- Strong armor against bomber defensive fire.

Disadvantages:

- Insufficient maneuverability for horizontal fights against maneuverable fighters;
- Limited time of flight due to quick fuel consumption;
- Low ammo load.

(BI-1 continued)

Pilot Notes:

- BI-1 is a rocket interceptor which can carry very little fuel. Its range is therefore very limited. In most situations you will climb on full power to meet the enemy, make one or two firing passes, and glide back to base with empty tanks.
- The throttle lever also works as an engine on/off switch. Moving the throttle to idle switches the engine off, opening the throttle turns the engine back on.
- BI-1 is not a turn fighter and almost any plane in the sim will outturn it. However it has good low-speed characteristics, and at full power it can outclimb and outdive anything;
- Bombers are your primary target, and fighters are usually too nimble for the BI-1.
- The two ShVAK cannon on the BI-1 have only 45 shells each which allows for less than one second of continuous fire. Open fire only at point-blank range.
- Best performance altitude is between 0 and 5,000 meters. Performance begins to deteriorate above 5,000 meters

BI-6



Type: Rocket Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---|----|--|
| 1 | Airspeed Indicator | 9 | Exhaust Temperature (Wingtip Rocket Right) |
| 2 | Altimeter | 10 | Engine Status 1 |
| 3 | Turn & Bank Indicator | 11 | Engine Status 2 |
| 4 | Oil & Air Pressure | 12 | Landing Gear Position Indicator |
| 5 | Fuel Level (Wingtip Rockets) | 13 | Fuel Level (Main Engine) |
| 6 | Fuel Pressure (Wingtip Rocket Left) | 14 | Engine On Light (Wingtip Rocket Left) |
| 7 | Fuel Pressure (Wingtip Rocket Right) | 15 | Engine On Light (Wingtip Rocket Right) |
| 8 | Exhaust Temperature (Wingtip Rocket Left) | | |

(BI-6 continued)

At a Glance:

Engine:

1 X LPR D-1-A-1100
2 x Glushkov RD-1

Power: 1 x 1,100 kg/s
2 x 300 kg/s

Armament:

- 2 x 20mm ShVAK cannon (45 shells each)

Advantages:

- Incredible climb rate;
- Small size makes for a difficult target;
- Easy to fly.

Disadvantages:

- Insufficient maneuverability for dogfights;
- Insufficient flight time;
- Short range.

Pilot Notes:

- This plane is powered by three engines: D-1-A-1100 rocket engine in the fuselage (engine #1), and two DM-4-S ramjets on the wingtips (engines #2 and #3).
- The wingtip ramjets have independent fuel source stored in the wings. They are effective at speeds above 320 km/h and have limited throttle control. Ramjets offer better fuel economy than the rocket engine, and are used to achieve better range at cruise speed. The main engine is to be used for take-off, acceleration, and maneuvering.
- The ramjet engines are engaged / disengaged with the throttle lever. With the throttle at 100%, an engine cannot be shut down; with the throttle at 0% it cannot be turned on. Correspondingly, to control the use of the ramjets, use the engine selection keys to select / deselect the throttle input.
- Having the same basic airframe as the BI-1, the aircraft is prone to enter uncontrollable dives at speeds in excess of 800 km/h.

We're not modeling the historical thrust difference between the two wingtip units, as this would make the plane virtually impossible to control with rudder trim. A simple decision historically would have been to place the ramjets closer to the fuselage; however we decided not to make such changes, as this would alter the aerodynamically pure original design.

We're also not modeling the historical unreliability of starting the ramjets in-flight.

Buffalo Mk I



Type: Fighter

Major Users: US; RAF; Netherlands

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Airspeed Indicator | 10 | Free Air Temperature |
| 2 | Turn & Bank Indicator | 11 | Oil Temp & Pressure; Fuel Pressure |
| 3 | Manifold Pressure | 12 | Cylinder Head Temperature |
| 4 | Altimeter | 13 | Fuel Level |
| 5 | Compass | 14 | Fuel Level |
| 6 | Artificial Horizon | 15 | Hydraulic Pressure |
| 7 | Variometer | 16 | Ammunition Counter (left side) |
| 8 | Clock | 17 | Ammunition Counter (right side) |
| 9 | RPM Indicator | | |

(Buffalo continued)

At a Glance:

Engine:

R-1820-G5

Power:

Continuous: 850 HP

Take-off : 950 HP

Combat (WEP) max 5min: 1,000 HP

Armament:

- 3 x .50cal + 1 x .30cal
- Later 4 x .50cal (12.7mm)

Advantages:

- Good maneuverability and handling;
- Spacious and well-organized cockpit;
- Good visibility.

Disadvantages:

- Obsolete compared to contemporary Axis planes;
- Inadequate speed and armament compared to late war planes.

Pilot Notes:

Take-Off Speed: 140 km/h

Landing Speed: 135 km/h

Combat Engine Setting: No RPM gauge

Best Cruise: No RPM gauge

Economy Cruise: No RPM gauge

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Buffalo is a decent dogfighter against most pre-1943 fighters, with the exception of the Zero. It will outturn almost any plane in a high-G instantaneous turn, however it will bleed off excessive amounts of speed in sustained turns. Your best bet against enemy fighters is to stay fast and not get involved in prolonged turning engagements, especially at low altitudes.
- Buffalo's armament is not particularly strong but it is adequate against most planes, with the possible exception of the Il-2. You will usually need at least a one-second burst at a vulnerable area to bring your target down. Just like with all machine-gun only planes, the best spot to aim for is the pilot.
- Brewster can stall rather easily if handled roughly, however when it is handled with care it can be a very tough opponent.
- Supercharger speeds need to be switched at around 3,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

F2A-2



Type: Carrier-Borne Fighter

Major Users: US Navy

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Airspeed Indicator | 10 | Free Air Temperature |
| 2 | Turn & Bank Indicator | 11 | Oil Temp & Pressure; Fuel Pressure |
| 3 | Manifold Pressure | 12 | Cylinder Head Temperature |
| 4 | Altimeter | 13 | Fuel Level |
| 5 | Compass | 14 | Fuel Level |
| 6 | Artificial Horizon | 15 | Hydraulic Pressure |
| 7 | Variometer | 16 | Ammunition Counter (left side) |
| 8 | Clock | 17 | Ammunition Counter (right side) |
| 9 | RPM Indicator | | |

(F2A continued)

At a Glance:

Engine:

Cyclone R-1820-G5

Power:

Continuous: 850 HP

Take-off : 950 HP

Combat (WEP) max 5min: 1,000 HP

Armament:

- 3 x .50cal + 1 x .30cal
- Later 4 x .50cal (12.7mm)

Advantages:

- Good maneuverability and handling;
- Spacious and well-organized cockpit;
- Good visibility.

Disadvantages:

- Obsolete compared to contemporary Axis planes;
- Inadequate speed and armament compared to late war planes.

Pilot Notes:

Take-Off Speed: 140 km/h

Landing Speed: 135 km/h

Combat Engine Setting: No RPM gauge

Best Cruise: No RPM gauge

Economy Cruise: No RPM gauge

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Buffalo is a decent dogfighter against most pre-1943 fighters, with the exception of the Zero. It will outturn almost any plane in a high-G instantaneous turn, however it will bleed off excessive amounts of speed in sustained turns. Your best bet against enemy fighters is to stay fast and not get involved in prolonged turning engagements, especially at low altitudes.
- Buffalo's armament is not particularly strong but it is adequate against most planes, with the possible exception of the IL-2. You will usually need at least a one-second burst at a vulnerable area to bring your target down. Just like with all machine-gun only planes, the best spot to aim for is the pilot.
- Brewster can stall rather easily if handled roughly, however when it is handled with care it can be a very tough opponent.
- Supercharger speeds need to be switched at around 3,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

F4F-3



Type: Carrier-Borne Fighter

Major Users: US Navy

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Compass | 8 | RPM Indicator |
| 2 | Artificial Horizon | 9 | Oil Temperature |
| 3 | Altimeter | 10 | Free Air Temperature |
| 4 | Airspeed Indicator | 11 | Oil Temp & Pressure; Fuel Pressure |
| 5 | Turn & Bank Indicator | 12 | Fuel Level |
| 6 | Variometer | 13 | Primer Pump |
| 7 | Manifold Pressure | 14 | Compass |

(F4F-3 continued)

At a Glance:

Engine:

1x R-1830-90.

Power: 1,200 HP.

Armament:

- 4 x .50 cal MG

Advantages:

- Good durability;
- Adequately armed.

Disadvantages:

- Poor maneuverability;
- Lack of performance.

Pilot Notes:

- Switch supercharger speeds at 2,500 meters (8,200 feet) and 4,800 meters (15,750 feet)
- Flaps are automatically retracted at 250 km/h (155 mph)
- Gear can only be operated manually; you have to manually assign keys for it in the Controls section.

F4F-4



Type: Carrier-Borne Fighter

Major Users: US Navy

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Compass | 8 | RPM Indicator |
| 2 | Artificial Horizon | 9 | Oil Temperature |
| 3 | Altimeter | 10 | Free Air Temperature |
| 4 | Airspeed Indicator | 11 | Oil Temp & Pressure; Fuel Pressure |
| 5 | Turn & Bank Indicator | 12 | Fuel Level |
| 6 | Variometer | 13 | Primer Pump |
| 7 | Manifold Pressure | 14 | Compass |

(F4F-4 continued)

At a Glance:

Engine:

1 x R-1830.

Power: 1,200 HP.

Armament:

- 6 x .50 cal MG

Advantages:

- Good durability;
- Adequately armed.

Disadvantages:

- Poor maneuverability;
- Lack of performance.

Pilot Notes:

- Switch supercharger speeds at 2,500 meters (8,200 feet) and 4,800 meters (15,750 feet)
- Flaps are automatically retracted at 250 km/h (155 mph)
- Gear can only be operated manually; you have to manually assign keys for it in the Controls section.

FM-2



Type: Carrier-Borne Fighter

Major Users: US Navy

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Compass | 8 | RPM Indicator |
| 2 | Artificial Horizon | 9 | Oil Temperature |
| 3 | Altimeter | 10 | Free Air Temperature |
| 4 | Airspeed Indicator | 11 | Oil Temp & Pressure; Fuel Pressure |
| 5 | Turn & Bank Indicator | 12 | Fuel Level |
| 6 | Variometer | 13 | Primer Pump |
| 7 | Manifold Pressure | 14 | Compass |

(FM-2 continued)

At a Glance:

Engine:

1x R-1820-56.

Power: 1,350 HP.

Armament:

- 6 x .50 cal MG
- 2 x 113-kg bombs
- 6 x 5-inch HVAR rockets

Advantages:

- Good durability;
- Adequately armed.

Disadvantages:

- Poor maneuverability;
- Lack of performance.

Pilot Notes:

- Switch supercharger speeds at 2,500 meters (8,200 feet) and 4,800 meters (15,750 feet)
- Flaps are automatically retracted at 250 km/h (155 mph)
- Gear can only be operated manually; you have to manually assign keys for it in the Controls section.

F4U-1A



Type: Carrier-Borne Fighter

Major Users: US Navy

Cockpit Guide:



- | | |
|------------------------------------|---|
| 1 Altimeter | 11 <i>Turn & Bank Indicator</i> |
| 2 Compass | 12 <i>Variometer</i> |
| 3 <i>Compass</i> | 13 <i>Cylinder Head Temperature</i> |
| 4 <i>Artificial Horizon</i> | 14 <i>Oil Pressure</i> |
| 5 <i>Clock</i> | 15 <i>Fuel Pressure</i> |
| 6 <i>Oil Temperature</i> | 16 Fuel Level |
| 7 <i>RPM Indicator</i> | 17 <i>Hydraulic Pressure</i> |
| 8 <i>Drop Tank Selector Switch</i> | 18 <i>Ammeter</i> |
| 9 <i>Manifold Pressure</i> | 19 <i>Fuel Tank Pressure</i> |
| 10 Airspeed Indicator | 20 <i>Landing Gear Position Indicator</i> |

(F4U-1A continued)

At a Glance:

Engine:

1 x R-2800-8W

Power: 2,250 HP

Armament:

- 6 x .50 cal MG (400 rounds per gun)

Advantages:

- Excellent performance;
- Good maneuverability;
- Excellent range;
- Adaptable to other roles;
- Well armed.

Disadvantages:

- Difficult handling;
- Poor forward visibility during landing and take-off.

Pilot Notes:

- Switch supercharger speeds at 2,600 meters (8,500 feet) and 8,200 meters (26,900 feet)
- The aircraft are also equipped with speed brakes that utilize a part of the gear mechanism. Please do not use this function during take-offs and landing, as in this way the gear isn't supported by additional hydraulic pump and may very well break off under the stress.

F4U-1C



Type: Carrier-Borne Fighter

Major Users: US Navy

Cockpit Guide:



- | | |
|------------------------------------|---|
| 1 Altimeter | 11 <i>Turn & Bank Indicator</i> |
| 2 Compass | 12 <i>Variometer</i> |
| 3 <i>Compass</i> | 13 <i>Cylinder Head Temperature</i> |
| 4 <i>Artificial Horizon</i> | 14 <i>Oil Pressure</i> |
| 5 <i>Clock</i> | 15 <i>Fuel Pressure</i> |
| 6 <i>Oil Temperature</i> | 16 Fuel Level |
| 7 <i>RPM Indicator</i> | 17 <i>Hydraulic Pressure</i> |
| 8 <i>Drop Tank Selector Switch</i> | 18 <i>Ammeter</i> |
| 9 <i>Manifold Pressure</i> | 19 <i>Fuel Tank Pressure</i> |
| 10 Airspeed Indicator | 20 <i>Landing Gear Position Indicator</i> |

(F4U-1C continued)

At a Glance:

Engine:

1 x R-2800-8W

Power: 2,250 HP

Armament:

- 4 x 20 mm cannon

Advantages:

- Excellent performance;
- Good maneuverability;
- Excellent range;
- Adaptable to other roles;
- Well armed.

Disadvantages:

- Difficult handling;
- Poor forward visibility during landing and take-off.

Pilot Notes:

- Switch supercharger speeds at 2,600 meters (8,500 feet) and 8,200 meters (26,900 feet)
- The aircraft are also equipped with speed brakes that utilize a part of the gear mechanism. Please do not use this function during take-offs and landing, as in this way the gear isn't supported by additional hydraulic pump and may very well break off under the stress.

F4U-1D



Type: Carrier-Borne Fighter

Major Users: US Navy

Cockpit Guide:



- | | |
|------------------------------------|---|
| 1 Altimeter | 11 <i>Turn & Bank Indicator</i> |
| 2 Compass | 12 <i>Variometer</i> |
| 3 <i>Compass</i> | 13 <i>Cylinder Head Temperature</i> |
| 4 <i>Artificial Horizon</i> | 14 <i>Oil Pressure</i> |
| 5 <i>Clock</i> | 15 <i>Fuel Pressure</i> |
| 6 <i>Oil Temperature</i> | 16 Fuel Level |
| 7 <i>RPM Indicator</i> | 17 <i>Hydraulic Pressure</i> |
| 8 <i>Drop Tank Selector Switch</i> | 18 <i>Ammeter</i> |
| 9 <i>Manifold Pressure</i> | 19 <i>Fuel Tank Pressure</i> |
| 10 Airspeed Indicator | 20 <i>Landing Gear Position Indicator</i> |

(F4U-1D continued)

At a Glance:

Engine:

1 x R-2800-8W

Power: 2,250 HP

Armament:

- 6 x .50 cal MG (400 rounds per gun)
- 2 x 1,000 lb bombs or 2 x 606-l fuel tanks
- 8x 5-inch HVAR rockets

Advantages:

- Excellent performance;
- Good maneuverability;
- Excellent range;
- Adaptable to other roles;
- Well armed.

Disadvantages:

- Difficult handling;
- Poor forward visibility during landing and take-off.

Pilot Notes:

- Switch supercharger speeds at 2,600 meters (8,500 feet) and 8,200 meters (26,900 feet)
- The aircraft are also equipped with speed brakes that utilize a part of the gear mechanism. Please do not use this function during take-offs and landing, as in this way the gear isn't supported by additional hydraulic pump and may very well break off under the stress.

Corsair Mk I



Type: Carrier-Borne Fighter

Major Users: Royal Navy

Cockpit Guide:



- | | |
|------------------------------------|---|
| 1 Altimeter | 11 <i>Turn & Bank Indicator</i> |
| 2 Compass | 12 <i>Variometer</i> |
| 3 <i>Compass</i> | 13 <i>Cylinder Head Temperature</i> |
| 4 <i>Artificial Horizon</i> | 14 <i>Oil Pressure</i> |
| 5 <i>Clock</i> | 15 <i>Fuel Pressure</i> |
| 6 <i>Oil Temperature</i> | 16 Fuel Level |
| 7 <i>RPM Indicator</i> | 17 <i>Hydraulic Pressure</i> |
| 8 <i>Drop Tank Selector Switch</i> | 18 <i>Ammeter</i> |
| 9 <i>Manifold Pressure</i> | 19 <i>Fuel Tank Pressure</i> |
| 10 Airspeed Indicator | 20 <i>Landing Gear Position Indicator</i> |

(Corsair Mk I continued)

At a Glance:

Engine:

1 x R-2800-8W

Power: 2,250 HP

Armament:

- 6 x .50 cal MG (400 rounds per gun)

Advantages:

- Excellent performance;
- Good maneuverability;
- Excellent range;
- Adaptable to other roles;
- Well armed.

Disadvantages:

- Difficult handling;
- Poor forward visibility during landing and take-off.

Pilot Notes:

- Switch supercharger speeds at 2,600 meters (8,500 feet) and 8,200 meters (26,900 feet)
- The aircraft are also equipped with speed brakes that utilize a part of the gear mechanism. Please do not use this function during take-offs and landing, as in this way the gear isn't supported by additional hydraulic pump and may very well break off under the stress.

Corsair Mk II



Type: Carrier-Borne Fighter

Major Users: Royal Navy

Cockpit Guide:



- | | |
|------------------------------------|---|
| 1 Altimeter | 11 <i>Turn & Bank Indicator</i> |
| 2 Compass | 12 <i>Variometer</i> |
| 3 <i>Compass</i> | 13 <i>Cylinder Head Temperature</i> |
| 4 <i>Artificial Horizon</i> | 14 <i>Oil Pressure</i> |
| 5 <i>Clock</i> | 15 <i>Fuel Pressure</i> |
| 6 <i>Oil Temperature</i> | 16 Fuel Level |
| 7 <i>RPM Indicator</i> | 17 <i>Hydraulic Pressure</i> |
| 8 <i>Drop Tank Selector Switch</i> | 18 <i>Ammeter</i> |
| 9 <i>Manifold Pressure</i> | 19 <i>Fuel Tank Pressure</i> |
| 10 Airspeed Indicator | 20 <i>Landing Gear Position Indicator</i> |

(Corsair Mk II continued)

At a Glance:

Engine:

1 x R-2800-8W

Power: 2,250 HP

Armament:

- 6 x .50 cal MG (400 rounds per gun)

Advantages:

- Excellent performance;
- Good maneuverability;
- Excellent range;
- Adaptable to other roles;
- Well armed.

Disadvantages:

- Difficult handling;
- Poor forward visibility during landing and take-off.

Pilot Notes:

- Switch supercharger speeds at 2,600 meters (8,500 feet) and 8,200 meters (26,900 feet)
- The aircraft are also equipped with speed brakes that utilize a part of the gear mechanism. Please do not use this function during take-offs and landing, as in this way the gear isn't supported by additional hydraulic pump and may very well break off under the stress.

F6F-3 Late



Type: Carrier-Borne Fighter

Major Users: US Navy

Cockpit Guide:



- | | | | |
|---|---------------------------|----|--------------------------------|
| 1 | Clock | 10 | Manifold Pressure |
| 2 | Compass | 11 | Ammunition Counter |
| 3 | Compass | 12 | Gear & Flap Position Indicator |
| 4 | Artificial Horizon | 13 | Fuel Level |
| 5 | RPM Indicator | 14 | Coolant Temperature |
| 6 | Altimeter | 15 | Oxygen Pressure |
| 7 | Airspeed Indicator | 16 | Oil Pressure |
| 8 | Turn & Bank Indicator | 17 | Coolant Temperature |
| 9 | Variometer | | |

(F6F-3 continued)

At a Glance:

Engine:

1 x R-2800-10W

Power: 2,000 HP

Armament:

- 6 x .50 cal MG
- 2 x 1,000 lb
- 2 x 500 lb
- 6 x rockets.

Advantages:

- Structurally well built;
- Well armed;
- Can take a lot of punishment.

Disadvantages:

- Not maneuverable enough compared to late-war Japanese fighters.
- Poor rearward visibility

Pilot Notes:

- Switch supercharger speeds at 2,500 meters (8,200 feet) and 8,100 meters (26,570 feet)

F6F-5



Type: Carrier-Borne Fighter

Major Users: US Navy

Cockpit Guide:



- | | | | |
|---|---------------------------|----|--------------------------------|
| 1 | Clock | 10 | Manifold Pressure |
| 2 | Compass | 11 | Ammunition Counter |
| 3 | Compass | 12 | Gear & Flap Position Indicator |
| 4 | Artificial Horizon | 13 | Fuel Level |
| 5 | RPM Indicator | 14 | Coolant Temperature |
| 6 | Altimeter | 15 | Oxygen Pressure |
| 7 | Airspeed Indicator | 16 | Oil Pressure |
| 8 | Turn & Bank Indicator | 17 | Coolant Temperature |
| 9 | Variometer | | |

(F6F-5 continued)

At a Glance:

Engine:

1 x R-2800-10W

Power: 2,000 HP

Armament:

- 6x.50 cal MG
- 2 x 1,000 lb
- 2 x 500 lb
- 2 x Tiny Tim rockets
- 6 x HVAR rockets.

Advantages:

- Structurally well built;
- Well armed;
- Can take a lot of punishment.

Disadvantages:

- Not maneuverable enough compared to late-war Japanese fighters.
- Poor rearward visibility

Pilot Notes:

- Switch supercharger speeds at 2,500 meters (8,200 feet) and 8,100 meters (26,570 feet)

Hurricane Mk IIb



Type: Fighter

Major Users: RAF; USSR

Cockpit Guide:



- 1 Landing Gear Position Indicator
- 2 Engine Temperature Warning Light
- 3 RPM Indicator
- 4 Oxygen Altitude
- 5 Oxygen Quantity
- 6 **Airspeed Indicator**
- 7 Artificial Horizon
- 8 Variometer
- 9 **Altimeter**

- 10 **Compass**
- 11 Turn & Bank Indicator
- 12 Manifold Pressure
- 13 Oil Pressure
- 14 Fuel Pressure
- 15 **Fuel Level**
- 16 Oil Temperature
- 17 Radiator Temperature

(Hurricane IIb continued)

At a Glance:

Engine:

Merlin XX

Power:

Indicated: 950 HP

Take-off: 1,280 HP

Armament:

- 12 x .303 machine guns

Advantages:

- Simple to control;
- Easy to maintain in field conditions;
- Reliable and stable in flight.

Disadvantages:

- Insufficient cockpit visibility;
- Inferior to contemporary enemy fighters.

Pilot Notes:

Take-Off Speed: 150 km/h / 85 kts

Landing Speed: 145 km/h / 80 kts

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,650 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Hurricane is generally inferior to all 1941 fighters, and inadequate against all 1942 and later fighters. It is mostly effective against bombers or as a ground attack plane.
- Hurricane has regretful acceleration and dive characteristics, therefore should generally be used in horizontal combat.
- Be aware that all instrumentation in the Hurricane is not metric but imperial, therefore you will need to learn to convert feet to meters and mile to kilometers when flying on instruments.
Hurricane is a rather stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds should be set to speed 2 in combat or in climb if boost is 2-5 psi below max; otherwise use speed 1.
- Best performance altitude is between 1,500 and 2,800 meters for speed 1 and 4,500 and 6,500 for speed 2.
- Worst performance between 3,000 and 4,500 meters

Hurricane Mk IIc



Type: Fighter/Bomber

Major Users: RAF; USSR

Cockpit Guide:



- 1 Landing Gear Position Indicator
- 2 Engine Temperature Warning Light
- 3 RPM Indicator
- 4 Oxygen Altitude
- 5 Oxygen Quantity
- 6 **Airspeed Indicator**
- 7 Artificial Horizon
- 8 Variometer
- 9 **Altimeter**

- 10 **Compass**
- 11 Turn & Bank Indicator
- 12 Manifold Pressure
- 13 Oil Pressure
- 14 Fuel Pressure
- 15 **Fuel Level**
- 16 Oil Temperature
- 17 Radiator Temperature

(Hurricane IIc continued)

At a Glance:

Engine:

Merlin XX

Power:

Indicated: 950 HP

Take-off: 1,280 HP

Armament:

- 4 x 20mm cannon

Advantages:

- Simple to control;
- Easy to maintain in field conditions;
- Reliable and stable in flight;
- Strong armament.

Disadvantages:

- Insufficient cockpit visibility;
- Inferior to contemporary enemy fighters.

Pilot Notes:

Take-Off Speed: 150 km/h / 85 kts

Landing Speed: 145 km/h / 80 kts

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,650 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Hurricane is generally inferior to all 1941 fighters, and inadequate against all 1942 and later fighters. It is mostly effective against bombers or as a ground attack plane.
- Hurricane has regretful acceleration and dive characteristics, therefore should generally be used in horizontal combat.
- Be aware that all instrumentation in the Hurricane is not metric but imperial, therefore you will need to learn to convert feet to meters and mile to kilometers when flying on instruments.
Hurricane is a rather stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds should be set to speed 2 in combat or in climb if boost is 2-5 psi below max; otherwise use speed 1.
- Best performance altitude is between 1,500 and 2,800 meters for speed 1 and 4,500 and 6,500 for speed 2.
- Worst performance between 3,000 and 4,500 meters

Hurricane Mk II field mod



Type: Fighter

Major Users: USSR

Cockpit Guide:



- 1 Landing Gear Position Indicator
- 2 Engine Temperature Warning Light
- 3 RPM Indicator
- 4 Oxygen Altitude
- 5 Oxygen Quantity
- 6 **Airspeed Indicator**
- 7 Artificial Horizon
- 8 Variometer
- 9 **Altimeter**

- 10 **Compass**
- 11 Turn & Bank Indicator
- 12 Manifold Pressure
- 13 Oil Pressure
- 14 Fuel Pressure
- 15 **Fuel Level**
- 16 Oil Temperature
- 17 Radiator Temperature

(Hurricane Field mod. continued)

At a Glance:

Engine:

Merlin XX

Power:

Indicated: 950 HP

Take-off: 1,280 HP

Armament:

- 2 x 12,7 mm UBS
- 2 x 20mm ShVAK cannon

Advantages:

- Simple to control;
- Easy to maintain in field conditions;
- Reliable and stable in flight.

Disadvantages:

- Insufficient cockpit visibility;
- Inferior to contemporary enemy fighters.

Pilot Notes:

Take-Off Speed: 150 km/h / 85 kts

Landing Speed: 145 km/h / 80 kts

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,650 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Hurricane is generally inferior to all 1941 fighters, and inadequate against all 1942 and later fighters. It is mostly effective against bombers or as a ground attack plane.
- Hurricane has regretful acceleration and dive characteristics, therefore should generally be used in horizontal combat.
- Be aware that all instrumentation in the Hurricane is not metric but imperial, therefore you will need to learn to convert feet to meters and mile to kilometers when flying on instruments.
Hurricane is a rather stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds should be set to speed 2 in combat or in climb if boost is 2-5 psi below max; otherwise use speed 1.
- Best performance altitude is between 1,500 and 2,800 meters for speed 1 and 4,500 and 6,500 for speed 2.
- Worst performance between 3,000 and 4,500 meters

I-153 M-62



Type: Biplane Fighter

Major Users: USSR

Cockpit Guide:



- 1 **Airspeed Indicator**
- 2 **Compass**
- 3 *RPM Indicator*
- 4 **Altimeter**
- 5 *Turn & Bank Indicator*
- 6 *Variometer*

- 7 *Oil Temp & Pressure; Fuel Pressure*
- 8 *Clock*
- 9 *Cylinder Head Temperature*
- 10 *Manifold Pressure*
- 11 *Landing Gear Position Indicator*

(I-153 continued)

At a Glance:

Engine:

1 x Shvetsov M-62.

Power: 1,000 HP

Armament:

- 4 x 7.62mm MG (ShKAS)

Advantages:

- The best mass-produced biplane fighter;
- Good maneuverability;
- Strong armament.

Disadvantages:

- Insufficient speed by the year 1941.

Pilot Notes:

Take-Off Speed: 145 km/h

Landing Speed: 130 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 1,600 RPM

Economy Cruise: 1,400 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- I-153 is an exceptional turn fighter which can literally fly circles around faster German planes. It can turn on a dime at almost any speed; unfortunately it has a very low top speed of only 366 km/h at sea level.
- The best tactic against enemy fighters is to stay horizontal, and attack the enemy with passes from his frontal quarter, denying him the opportunity to fire by coming in slightly from the side.
- Against bombers, I-153 is not very effective as many bombers can simply outrun the Chaika. For slow flying bombers, don't waste airspeed on maneuver and hang back in the bombers rear quarter. I-153 presents a very small profile for a bomber gunner so staying at respectable distance should keep you safe.
- When used as ground attack, bombs and rockets should be fired in 15-45 degree dives.
- I-153 is a rather stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds need to be switched at around 1,500 meters. Best performance altitude is between 0 and 2,500 meters. Performance begins to deteriorate above 2,500 meters

I-153P



Type: Biplane Fighter

Major Users: USSR

Cockpit Guide:



- 1** *Airspeed Indicator*
- 2** *Compass*
- 3** *RPM Indicator*
- 4** *Altimeter*
- 5** *Turn & Bank Indicator*
- 6** *Variometer*

- 7** *Oil Temp & Pressure; Fuel Pressure*
- 8** *Clock*
- 9** *Cylinder Head Temperature*
- 10** *Manifold Pressure*
- 11** *Landing Gear Position Indicator*

(I-153P continued)

At a Glance:

Engine:

1 x Shvetsov M-62.

Power: 1,000 HP

Armament:

- 2 x 20mm cannon (ShVAK).

Advantages:

- The best mass-produced biplane fighter;
- Good maneuverability;
- Powerful armament.

Disadvantages:

- Insufficient speed by the year 1941.

Pilot Notes:

Take-Off Speed: 145 km/h

Landing Speed: 130 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 1,600 RPM

Economy Cruise: 1,400 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- I-153 is an exceptional turn fighter which can literally fly circles around faster German planes. It can turn on a dime at almost any speed; unfortunately it has a very low top speed of only 366 km/h at sea level.
- The best tactic against enemy fighters is to stay horizontal, and attack the enemy with passes from his frontal quarter, denying him the opportunity to fire by coming in slightly from the side.
- Against bombers, I-153 is not very effective as many bombers can simply outrun the Chaika. For slow flying bombers, don't waste airspeed on maneuver and hang back in the bombers rear quarter. I-153 presents a very small profile for a bomber gunner so staying at respectable distance should keep you safe.
- When used as ground attack, bombs and rockets should be fired in 15-45 degree dives.
- I-153 is a rather stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds need to be switched at around 1,500 meters. Best performance altitude is between 0 and 2,500 meters. Performance begins to deteriorate above 2,500 meters

I-16 Type 18



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|---------------------------|
| 1 | Clock | 10 | Oil Pressure |
| 2 | Radio | 11 | Manifold Pressure |
| 3 | Left Landing Gear Light | 12 | Turn & Bank Indicator |
| 4 | Right Landing Gear Light | 13 | Variometer |
| 5 | RPM Indicator | 14 | Cylinder Head Temperature |
| 6 | Airspeed Indicator | 15 | Oil Temperature (IN) |
| 7 | Compass | 16 | Oil Temperature (OUT) |
| 8 | Altimeter | 17 | Fuel Level |
| 9 | Air Pressure | | |

(I-16 18 continued)

At a Glance:

Engine:

1 x M-62

Power: 1 x 800 HP

Armament:

- 4 x 7.62mm MG (ShKAS)

Advantages:

- Excellent performance characteristics;
- Excellent maneuverability.

Disadvantages:

- Excessive control sensitivity.
- Slow and underpowered by 1941 standards.

Pilot Notes:

Take-Off Speed: 150 km/h

Landing Speed: 145 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 1,850 RPM

Economy Cruise: 1,600 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Excellent turn fighter with adequate performance for 1941. In capable hands can fight Bf-109E on equal terms, and Bf-109F with slight disadvantage. Both energy and angles tactics can be used against these planes at altitudes up to 3,500 meters.
- Inferior to later German fighters; I-153 tactics should be used against those.
- I-16 Tip 24 has very strong armament, while I-16 Tip 18 has a rather weak armament which may be ineffective against well-armored targets.
- Supercharger speeds need to be switched at around 1,500 meters. Best performance altitude is between 0 and 3,500 meters. Performance begins to deteriorate above 3,500 meters
- I-16 gear can only be operated manually. In order to raise or lower it, you will need to bind the corresponding keys in the Controls section and then keep pressing them until the gear lights on the dashboard come on (red = down, green = up)

I-16 Type 24



Type: Fighter

Major Users: USSR

Cockpit Guide:



- 1 Clock
- 2 Radio
- 3 Left Landing Gear Light
- 4 Right Landing Gear Light
- 5 RPM Indicator
- 6 **Airspeed Indicator**
- 7 Compass
- 8 **Altimeter**
- 9 Air Pressure

- 10 Oil Pressure
- 11 Manifold Pressure
- 12 Turn & Bank Indicator
- 13 Variometer
- 14 Cylinder Head Temperature
- 15 Oil Temperature (IN)
- 16 Oil Temperature (OUT)
- 17 **Fuel Level**

(I-16 24 continued)

At a Glance:

Engine:

1 x M-63.

Power: 900 HP at critical altitude
1000 HP at sea level

Armament:

- 2 x 7.62mm MG (ShKAS).
- 2 x 20mm cannon (ShVAK)

Advantages:

- Excellent performance characteristics;
- Excellent maneuverability.

Disadvantages:

- Excessive control sensitivity.

Pilot Notes:

Take-Off Speed: 150 km/h

Landing Speed: 145 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 1,850 RPM

Economy Cruise: 1,600 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Excellent turn fighter with adequate performance for 1941. In capable hands can fight Bf-109E on equal terms, and Bf-109F with slight disadvantage. Both energy and angles tactics can be used against these planes at altitudes up to 3,500 meters.
- Inferior to later German fighters; I-153 tactics should be used against those.
- I-16 Tip 24 has very strong armament, while I-16 Tip 18 has a rather weak armament which may be ineffective against well-armored targets.
- Supercharger speeds need to be switched at around 1,500 meters. Best performance altitude is between 0 and 3,500 meters. Performance begins to deteriorate above 3,500 meters
- I-16 gear can only be operated manually. In order to raise or lower it, you will need to bind the corresponding keys in the Controls section and then keep pressing them until the gear lights on the dashboard come on (red = down, green = up)

I-16 Type 24 SPB



Type: Fighter

Major Users: USSR

Cockpit Guide:



- 1 Clock
- 2 Radio
- 3 Left Landing Gear Light
- 4 Right Landing Gear Light
- 5 RPM Indicator
- 6 **Airspeed Indicator**
- 7 Compass
- 8 **Altimeter**
- 9 Air Pressure

- 10 Oil Pressure
- 11 Manifold Pressure
- 12 Turn & Bank Indicator
- 13 Variometer
- 14 Cylinder Head Temperature
- 15 Oil Temperature (IN)
- 16 Oil Temperature (OUT)
- 17 **Fuel Level**

(I-16 24 SPB continued)

At a Glance:

Engine:

1 x M-63.

Power: 900 HP at critical altitude
1000 HP at sea level

Armament:

- 2 x 7.62mm MG (ShKAS).
- 2 x 20mm cannon (ShVAK)

Advantages:

- Excellent performance characteristics;
- Excellent maneuverability.

Disadvantages:

- Excessive control sensitivity.

Using the SPB

- The SPB consists of the TB-3 mothership and a pair of attached I-16s. There are special versions of these, TB-3 4M-34R SPB and I-16type24 SPB.
- When building a mission, you can attach the I-16 to the mothership the same way you attach gliders to planes – set up a flight of I-16s with one waypoint, and set the waypoint's target to the TB-3 (go to the Waypoint tab of the Object window with your I-16 selected, hit the Set button and click on the TB-3). The I-16 will be attached to the TB-3 in the beginning of the mission. You cannot build missions where I-16s start detached from the TB-3 and attach afterwards.
- AI flying these I-16s will automatically detach when the TB-3 approaches a GATTACK waypoint. The I-16s then will attack the site and return to escort the TB-3 back. You may use the "Aircraft Attach/Detach" button when flying these planes to detach from the TB-3, or drop the I-16s if you're flying the TB-3.
- In dogfight mode, you may attach your I-16 to the TB-3 mothership while on the airfield. To do so, taxi the plane to the attachment port under the TB-3's wing, and press the "Aircraft Attach/Detach" button. Your plane will be attached to the mothership and your landing gear will be raised automatically.
- Note that while attached to a TB-3, I-16s drain the mothership's fuel reserve, and if their engines are left at low RPM their fuel tanks will slowly refill to 100%.

In all other respects the I-16 Type 24 *Pilot Notes* should be used.

I-185 M-71



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|----------------------------------|----|---|
| 1 | <i>Ammeter</i> | 9 | <i>Oil Temp & Pressure; Fuel Pressure</i> |
| 2 | Compass | 10 | Altimeter |
| 3 | <i>Clock</i> | 11 | <i>Compass</i> |
| 4 | Fuel Level | 12 | <i>Artificial Horizon</i> |
| 5 | Airspeed Indicator | 13 | <i>RPM Indicator</i> |
| 6 | <i>Turn & Bank Indicator</i> | 14 | <i>Cylinder Head Temperature</i> |
| 7 | <i>Variometer</i> | 15 | <i>Oxygen Apparatus</i> |
| 8 | <i>Manifold Pressure</i> | 16 | <i>Landing Gear Indicator Lights</i> |

(I-185 continued)

At a Glance:

Engine:

1 x M-71

Power: 2,000 HP

Armament:

- 3 x 20mm cannon (ShVAK)

Advantages:

- Excellent flying characteristics.

Disadvantages:

- Never entered serial production

Pilot Notes:

- Supercharger speeds need to be switched at 2,000 meters, and then at 4,200 meters.
- Mixture adjustment is requires at altitudes above 5,000 meters.

I-185 M-82A



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---|----|--------------------------------------|
| 1 | <i>Ammeter</i> | 10 | <i>Altimeter</i> |
| 2 | <i>Compass</i> | 11 | <i>Compass</i> |
| 3 | <i>Clock</i> | 12 | <i>Artificial Horizon</i> |
| 4 | <i>Fuel Level</i> | 13 | <i>RPM Indicator</i> |
| 5 | <i>Airspeed Indicator</i> | 14 | <i>Cylinder Head Temperature</i> |
| 6 | <i>Turn & Bank Indicator</i> | 15 | <i>Oxygen Apparatus</i> |
| 7 | <i>Variometer</i> | 16 | <i>Carburetor Pressure</i> |
| 8 | <i>Manifold Pressure</i> | 17 | <i>Oil Pressure</i> |
| 9 | <i>Oil Temp & Pressure; Fuel Pressure</i> | 18 | <i>Landing Gear Indicator Lights</i> |

(I-185 M-82 continued)

At a Glance:

Engine:

1 x M-82A

Power: 1,800 HP

Armament:

- 3 x 20mm cannon (ShVAK)

Advantages:

- Excellent flying characteristics.

Disadvantages:

- Never entered serial production

Pilot Notes:

- Supercharger speeds need to be switched at 2,000 meters, and then at 4,200 meters.
- Mixture adjustment is requires at altitudes above 5,000 meters.

I-250



Type: Mixed Power Fighter

Major Users: USSR

Cockpit Guide:



- | | |
|---|--|
| 1 Altimeter | 12 <i>Oxygen Indicator</i> |
| 2 <i>Compass</i> | 13 <i>Oil Temperature</i> |
| 3 <i>Clock</i> | 14 <i>Coolant Temperature</i> |
| 4 Airspeed Indicator | 15 <i>Exhaust Temperature</i> |
| 5 <i>Artificial Horizon</i> | 16 <i>Manifold Pressure (Jet Engine)</i> |
| 6 <i>Variometer</i> | 17 <i>Landing Gear Indicator Lights</i> |
| 7 <i>Manifold Pressure (Piston Engine)</i> | 18 <i>Exhaust Pressure</i> |
| 8 <i>RPM Indicator</i> | 19 <i>Fuel Pressure (Jet Engine)</i> |
| 9 <i>Oil Temp & Pressure; Fuel Pressure</i> | 20 <i>Ammeter</i> |
| 10 <i>Gun Arm Indicator Lights</i> | 21 <i>Voltmeter</i> |
| 11 <i>Oxygen Quantity</i> | 22 Fuel Level |

(I-250 continued)

At a Glance:

Engine:

- 1 x Klimov VK-107R V-12,
- 1 x VDRK Compressor Jet

Power: 2,560 HP at sea level

Armament:

- 3 x 20mm B-20 cannon (100 shells each)
- Up to 230 kg of bombs

Advantages:

- Good speed characteristics;
- Powerful armament;
- Good pilot protection.

Disadvantages:

- Low reliability of the jet engine;
- Insufficient flight time at high speeds.

Pilot Notes:

- The tail unit of the aircraft contains a turbojet engine, driven by an extension shaft connected to the main piston engine. The tail engine is used as a regular jet, and has no specific limitations; however it should be used sparingly as it burns through fuel very quickly (about 10 minutes at cruise power). As such, the jet engine should only be used in combat and other non-routine conditions.
- The engine starting procedure is as follows: first start and get the piston engine to low RPM. The jet engine cannot be started otherwise, as it requires the crankshaft to rotate, which is powered by the piston engine. After successfully starting the piston engine, you may engage the jet. If you lose the piston engine due to battle damage or other failures, the jet engine will not operate even if it is completely intact.

Low reliability of the jet engine is not modeled.

Il-2 1941 1 Series



Type: Sturmovik

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|-------------------------------|----|-------------------------------------|
| 1 | Airspeed Indicator | 10 | Manifold Pressure |
| 2 | Compass | 11 | Coolant Temperature |
| 3 | Variometer | 12 | RPM Indicator |
| 4 | Altimeter | 13 | Oil Pressure |
| 5 | Turn & Bank Indicator | 14 | Oil Temp & Pressure; Fuel Pressure |
| 6 | Artificial Horizon | 15 | Fuel Level |
| 7 | Clock | 16 | Brake Pressure |
| 8 | Ammeter | 17 | Air Pressure |
| 9 | Landing Gear Indicator Lights | 18 | Gear Position Indicator (not shown) |

(IL-2 continued)

At a Glance:

Engine:

AM-38.

Power:

Indicated: 1,500 HP;

Take-off: 1,665 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 2 x 20mm cannon (ShVAK);
- 16 x RS-82;
- Up to 600 kg of bombs.

Advantages:

- Unique attack aircraft.
- Excellent performance;
- Strong armor and fire power;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- No rear hemisphere protection;
- Vulnerable oil radiator.

Pilot Notes:

Take-Off Speed: 150 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,100 RPM

Best Cruise: 1,800 RPM

Economy Cruise: 1,600 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- Outstanding ground attack plane that can also defend itself in air-to-air combat.
- Primary means of attacking ground targets is in 15-45 degree dives starting from 500 or 1,000 meters
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns and cannons are ineffective against tanks, but very effective against softer targets.
- Enemy fighters can be brought down by IL-2's working in pairs or in larger groups. In one-on-one against an enemy fighter IL-2 does not stand much of a chance but in capable hands can be very challenging to bring down.
- IL-2 single seats are capable of a loop or a chandelle at speeds above 350 km/h, but will decelerate to below their stall speed by the top of the loop. Therefore when attacked by an enemy fighter, stay at extremely low altitudes and use energy tactics in the horizontal pane.
- Causing the enemy to overshoot, or extending and attacking head-on are the best tactics.
- IL-2's armament is extremely effective against all aerial targets.

Il-2 1941 2 Series



Type: Sturmovik

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|-------------------------------|----|-------------------------------------|
| 1 | Airspeed Indicator | 10 | Manifold Pressure |
| 2 | Compass | 11 | Coolant Temperature |
| 3 | Variometer | 12 | RPM Indicator |
| 4 | Altimeter | 13 | Oil Pressure |
| 5 | Turn & Bank Indicator | 14 | Oil Temp & Pressure; Fuel Pressure |
| 6 | Artificial Horizon | 15 | Fuel Level |
| 7 | Clock | 16 | Brake Pressure |
| 8 | Ammeter | 17 | Air Pressure |
| 9 | Landing Gear Indicator Lights | 18 | Gear Position Indicator (not shown) |

(IL-2 continued)

At a Glance:

Engine:

AM-38.

Power:

Indicated: 1,500 HP;

Take-off: 1,665 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 2 x 20mm cannon (ShVAK);
- 8 x RS-82;
- Up to 600 kg of bombs.

Advantages:

- Unique attack aircraft;
- Excellent performance;
- Strong armor and fire power;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- No rear hemisphere protection;
- Vulnerable oil radiator.

Pilot Notes:

Take-Off Speed: 150 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,100 RPM

Best Cruise: 1,800 RPM

Economy Cruise: 1,600 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- Outstanding ground attack plane that can also defend itself in air-to-air combat.
- Primary means of attacking ground targets is in 15-45 degree dives starting from 500 or 1,000 meters
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns and cannons are ineffective against tanks, but very effective against softer targets.
- Enemy fighters can be brought down by IL-2's working in pairs or in larger groups. In one-on-one against an enemy fighter IL-2 does not stand much of a chance but in capable hands can be very challenging to bring down.
- IL-2 single seats are capable of a loop or a chandelle at speeds above 350 km/h, but will decelerate to below their stall speed by the top of the loop. Therefore when attacked by an enemy fighter, stay at extremely low altitudes and use energy tactics in the horizontal pane.
- Causing the enemy to overshoot, or extending and attacking head-on are the best tactics.
- IL-2's armament is extremely effective against all aerial targets.

Il-2 1941 3 Series



Type: Sturmovik

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|-------------------------------|----|-------------------------------------|
| 1 | Airspeed Indicator | 10 | Manifold Pressure |
| 2 | Compass | 11 | Coolant Temperature |
| 3 | Variometer | 12 | RPM Indicator |
| 4 | Altimeter | 13 | Oil Pressure |
| 5 | Turn & Bank Indicator | 14 | Oil Temp & Pressure; Fuel Pressure |
| 6 | Artificial Horizon | 15 | Fuel Level |
| 7 | Clock | 16 | Brake Pressure |
| 8 | Ammeter | 17 | Air Pressure |
| 9 | Landing Gear Indicator Lights | 18 | Gear Position Indicator (not shown) |

(IL-2 continued)

At a Glance:

Engine:

AM-38.

Power:

Indicated: 1,500 HP;

Take-off: 1,665 HP

Armament:

- 2 x 7.2mm MG (ShKAS);
- 2 x 23mm cannon (VYa);
- 8 x RS-82;
- Up to 600 kg of bombs

Advantages:

- Unique attack aircraft;
- Excellent performance;
- Strong armor and fire power;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- No rear hemisphere protection;
- Vulnerable oil radiator.

Pilot Notes:

Engine: 1,500 HP

Take-Off Speed: 150 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,100 RPM

Best Cruise: 1,800 RPM

Economy Cruise: 1,600 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- Outstanding ground attack plane that can also defend itself in air-to-air combat.
- Primary means of attacking ground targets is in 15-45 degree dives starting from 500 or 1,000 meters
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns and cannons are ineffective against tanks, but very effective against softer targets.
- Enemy fighters can be brought down by IL-2's working in pairs or in larger groups. In one-on-one against an enemy fighter IL-2 does not stand much of a chance but in capable hands can be very challenging to bring down.
- IL-2 single seats are capable of a loop or a chandelle at speeds above 350 km/h, but will decelerate to below their stall speed by the top of the loop. Therefore when attacked by an enemy fighter, stay at extremely low altitudes and use energy tactics in the horizontal pane.
- Causing the enemy to overshoot, or extending and attacking head-on are the best tactics.
- IL-2's armament is extremely effective against all aerial targets.

Il-2 1941 field mod



Type: Sturmovik

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|-------------------------------|----|-------------------------------------|
| 1 | Airspeed Indicator | 10 | Manifold Pressure |
| 2 | Compass | 11 | Coolant Temperature |
| 3 | Variometer | 12 | RPM Indicator |
| 4 | Altimeter | 13 | Oil Pressure |
| 5 | Turn & Bank Indicator | 14 | Oil Temp & Pressure; Fuel Pressure |
| 6 | Artificial Horizon | 15 | Fuel Level |
| 7 | Clock | 16 | Brake Pressure |
| 8 | Ammeter | 17 | Air Pressure |
| 9 | Landing Gear Indicator Lights | 18 | Gear Position Indicator (not shown) |

Other Playable Crew Positions:

[AI Only]

Rear Gunner

(IL-2 continued)

At a Glance:

Engine:

AM-38.

Power:

Indicated: 1,500 HP;

Take-off: 1,665 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 2 x 7.62mm MG (DA) or 1 x 7.62mm MG (ShKAS);
- 2 x 23mm cannon (VYa);
- 8 x RS-82;
- Up to 500 kg of bombs.

Advantages:

- Good overall flying characteristics;
- Strong armor and fire power;
- Increased aircraft durability;
- Unsurpassed aircraft protection;
- Easy to fly.

Disadvantages:

- Unprotected rear gunner;
- Vulnerable oil radiator.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,000 RPM

Best Cruise: 1,800 RPM

Economy Cruise: 1,700 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- Two-seater IL-2s are heavier, slower and less maneuverable than the single-seat variants. Most maneuvers should be restricted to the horizontal plane. All two-seaters except 1941 Field Mod bleed off excessive speed in hard turns, especially with external ordnance. In most conditions no more than 1.5-2 G turns should be used. All two-seaters are incapable of a loop or a chandelle at speeds below 360 km/h, and will decelerate to below their stall speed by the top of the loop.
- Primary means of attacking ground targets is in 15-45 degree dives starting from 500 or 1,000 meters
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns and cannons of all IL-2 two-seaters except IL-2M3 are marginally effective against tanks and very effective against softer targets.
- IL-2M3's 37mm cannon are very effective against all enemy tanks. Tanks are best attacked from the rear where their armor is the weakest.
- When attacked by enemy fighters the rear gunner is the best defense. Dive to ground level and maneuver to keep the enemy fighter within the rear gunner's defensive arc. Causing the enemy to overshoot, or extending and attacking head-on will work if the enemy allows you to do that.

Il-2M 1942 1 Series



Type: Sturmovik

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|-------------------------------|----|-------------------------------------|
| 1 | Airspeed Indicator | 10 | Manifold Pressure |
| 2 | Compass | 11 | Coolant Temperature |
| 3 | Variometer | 12 | RPM Indicator |
| 4 | Altimeter | 13 | Oil Pressure |
| 5 | Turn & Bank Indicator | 14 | Oil Temp & Pressure; Fuel Pressure |
| 6 | Artificial Horizon | 15 | Fuel Level |
| 7 | Clock | 16 | Brake Pressure |
| 8 | Ammeter | 17 | Air Pressure |
| 9 | Landing Gear Indicator Lights | 18 | Gear Position Indicator (not shown) |

Other Playable Crew Positions:



Rear Gunner

(IL-2 continued)

At a Glance:

Engine:

AM-38.

Power:

Indicated: 1,500 HP;

Take-off: 1,665 HP

Armament:

- 2 x 7.62mm (ShKAS);
- 1 x 12.7mm (UBT);
- 2 x 23mm (VYa);
- 4 x RS-82 or 4 x RS-132;
- Up to 600 kg of bombs.

Advantages:

- Good overall flying characteristics;
- Strong armor and fire power;
- Increased aircraft durability;
- Unsurpassed aircraft protection;
- Easy to fly.

Disadvantages:

- Reduction of aircraft speed;
- Vulnerable oil radiator.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,000 RPM

Best Cruise: 1,800 RPM

Economy Cruise: 1,700 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- Two-seater IL-2s are heavier, slower and less maneuverable than the single-seat variants. Most maneuvers should be restricted to the horizontal plane. All two-seaters except 1941 Field Mod bleed off excessive speed in hard turns, especially with external ordnance. In most conditions no more than 1.5-2 G turns should be used. All two-seaters are incapable of a loop or a chandelle at speeds below 360 km/h, and will decelerate to below their stall speed by the top of the loop.
- Primary means of attacking ground targets is in 15-45 degree dives starting from 500 or 1,000 meters
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns and cannons of all IL-2 two-seaters except IL-2M3 are marginally effective against tanks and very effective against softer targets.
- IL-2M3's 37mm cannon are very effective against all enemy tanks. Tanks are best attacked from the rear where their armor is the weakest.
- When attacked by enemy fighters the rear gunner is the best defense. Dive to ground level and maneuver to keep the enemy fighter within the rear gunner's defensive arc. Causing the enemy to overshoot, or extending and attacking head-on will work if the enemy allows you to do that.

Il-2M 1942 Later Series



Type: Sturmovik

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|-------------------------------|----|-------------------------------------|
| 1 | Airspeed Indicator | 10 | Manifold Pressure |
| 2 | Compass | 11 | Coolant Temperature |
| 3 | Variometer | 12 | RPM Indicator |
| 4 | Altimeter | 13 | Oil Pressure |
| 5 | Turn & Bank Indicator | 14 | Oil Temp & Pressure; Fuel Pressure |
| 6 | Artificial Horizon | 15 | Fuel Level |
| 7 | Clock | 16 | Brake Pressure |
| 8 | Ammeter | 17 | Air Pressure |
| 9 | Landing Gear Indicator Lights | 18 | Gear Position Indicator (not shown) |

Other Playable Crew Positions:



Rear Gunner

(IL-2 continued)

At a Glance:

Engine:

AM-38.

Power:

Indicated: 1,500 HP;

Take-off: 1,665 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 1 x 12.7mm MG (UBT);
- 2 x 23mm cannon (VYa);
- 4 x RS-82 or 4 x RS-132;
- Up to 600 kg of bombs.

Advantages:

- Good overall flying characteristics;
- Strong armor and fire power;
- Increased aircraft durability;
- Unsurpassed aircraft protection;
- Easy to fly.

Disadvantages:

- Reduction of diving speed and maneuverability;
- Reduced flight performance;
- Mixed metal/wooden wing type;
- Vulnerable oil radiator.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,000 RPM

Best Cruise: 1,800 RPM

Economy Cruise: 1,700 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- Two-seater IL-2s are heavier, slower and less maneuverable than the single-seat variants. Most maneuvers should be restricted to the horizontal plane. All two-seaters except 1941 Field Mod bleed off excessive speed in hard turns, especially with external ordnance. In most conditions no more than 1.5-2 G turns should be used. All two-seaters are incapable of a loop or a chandelle at speeds below 360 km/h, and will decelerate to below their stall speed by the top of the loop.
- Primary means of attacking ground targets is in 15-45 degree dives starting from 500 or 1,000 meters
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns and cannons of all IL-2 two-seaters except IL-2M3 are marginally effective against tanks and very effective against softer targets.
- IL-2M3's 37mm cannon are very effective against all enemy tanks. Tanks are best attacked from the rear where their armor is the weakest.
- When attacked by enemy fighters the rear gunner is the best defense. Dive to ground level and maneuver to keep the enemy fighter within the rear gunner's defensive arc. Causing the enemy to overshoot, or extending and attacking head-on will work if the enemy allows you to do that.

Il-2 Type 3



Type: Sturmovik

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|-------------------------------|----|-------------------------------------|
| 1 | Airspeed Indicator | 10 | Manifold Pressure |
| 2 | Compass | 11 | Coolant Temperature |
| 3 | Variometer | 12 | RPM Indicator |
| 4 | Altimeter | 13 | Oil Pressure |
| 5 | Turn & Bank Indicator | 14 | Oil Temp & Pressure; Fuel Pressure |
| 6 | Artificial Horizon | 15 | Fuel Level |
| 7 | Clock | 16 | Brake Pressure |
| 8 | Ammeter | 17 | Air Pressure |
| 9 | Landing Gear Indicator Lights | 18 | Gear Position Indicator (not shown) |

Other Playable Crew Positions:



Rear Gunner

(IL-2 continued)

At a Glance:

Engine:

AM-38F.

Power:

Indicated: 1,575 HP;

Take-off: 1,720 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 1 x 12.7mm MG (UBT);
- 2 x 23mm cannon (VYa);
- 4 x RS-82 or 4 x RS-132;
- Up to 600 kg of bombs.

Advantages:

- Good overall flying characteristics;
- Strong armor and fire power;
- Increased aircraft durability;
- Unsurpassed aircraft protection;
- Easy to fly.

Disadvantages:

- Vulnerable oil radiator.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,000 RPM

Best Cruise: 1,800 RPM

Economy Cruise: 1,700 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- Two-seater IL-2s are heavier, slower and less maneuverable than the single-seat variants. Most maneuvers should be restricted to the horizontal plane. All two-seaters except 1941 Field Mod bleed off excessive speed in hard turns, especially with external ordnance. In most conditions no more than 1.5-2 G turns should be used. All two-seaters are incapable of a loop or a chandelle at speeds below 360 km/h, and will decelerate to below their stall speed by the top of the loop.
- Primary means of attacking ground targets is in 15-45 degree dives starting from 500 or 1,000 meters
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns and cannons of all IL-2 two-seaters except IL-2M3 are marginally effective against tanks and very effective against softer targets.
- IL-2M3's 37mm cannon are very effective against all enemy tanks. Tanks are best attacked from the rear where their armor is the weakest.
- When attacked by enemy fighters the rear gunner is the best defense. Dive to ground level and maneuver to keep the enemy fighter within the rear gunner's defensive arc. Causing the enemy to overshoot, or extending and attacking head-on will work if the enemy allows you to do that.

Il-2 Type 3M



Type: Sturmovik

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|-------------------------------|----|-------------------------------------|
| 1 | Airspeed Indicator | 10 | Manifold Pressure |
| 2 | Compass | 11 | Coolant Temperature |
| 3 | Variometer | 12 | RPM Indicator |
| 4 | Altimeter | 13 | Oil Pressure |
| 5 | Turn & Bank Indicator | 14 | Oil Temp & Pressure; Fuel Pressure |
| 6 | Artificial Horizon | 15 | Fuel Level |
| 7 | Clock | 16 | Brake Pressure |
| 8 | Ammeter | 17 | Air Pressure |
| 9 | Landing Gear Indicator Lights | 18 | Gear Position Indicator (not shown) |

Other Playable Crew Positions:



Rear Gunner

(II-2 continued)

At a Glance:

Engine:

AM-38F.

Power:

Indicated: 1,575 HP;

Take-off: 1,720 HP

Armament:

- 2 x 7.2mm MG (ShKAS);
- 1 x 12.7mm MG (UBT);
- 2 x 37mm cannon (NS-37);
- 4 x RS-82 or 4 x RS-132;
- Up to 200 kg of bombs.

Advantages:

- Good overall flying characteristics;
- Strong armor and fire power;
- Increased aircraft durability;
- Unsurpassed aircraft protection;
- Easy to fly.

Disadvantages:

- Strong recoil;
- Lower bomb load;
- Vulnerable oil radiator.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,000 RPM

Best Cruise: 1,800 RPM

Economy Cruise: 1,700 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- Two-seater IL-2s are heavier, slower and less maneuverable than the single-seat variants. Most maneuvers should be restricted to the horizontal plane. All two-seaters except 1941 Field Mod bleed off excessive speed in hard turns, especially with external ordnance. In most conditions no more than 1.5-2 G turns should be used. All two-seaters are incapable of a loop or a chandelle at speeds below 360 km/h, and will decelerate to below their stall speed by the top of the loop.
- Primary means of attacking ground targets is in 15-45 degree dives starting from 500 or 1,000 meters
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns and cannons of all IL-2 two-seaters except IL-2M3 are marginally effective against tanks and very effective against softer targets.
- IL-2M3's 37mm cannon are very effective against all enemy tanks. Tanks are best attacked from the rear where their armor is the weakest.
- When attacked by enemy fighters the rear gunner is the best defense. Dive to ground level and maneuver to keep the enemy fighter within the rear gunner's defensive arc. Causing the enemy to overshoot, or extending and attacking head-on will work if the enemy allows you to do that.

ИИ-2Т



Type: Torpedo Bomber

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|-------------------------------|----|-------------------------------------|
| 1 | Airspeed Indicator | 10 | Manifold Pressure |
| 2 | Compass | 11 | Coolant Temperature |
| 3 | Variometer | 12 | RPM Indicator |
| 4 | Altimeter | 13 | Oil Pressure |
| 5 | Turn & Bank Indicator | 14 | Oil Temp & Pressure; Fuel Pressure |
| 6 | Artificial Horizon | 15 | Fuel Level |
| 7 | Clock | 16 | Brake Pressure |
| 8 | Ammeter | 17 | Air Pressure |
| 9 | Landing Gear Indicator Lights | 18 | Gear Position Indicator (not shown) |

Other Playable Crew Positions:



Rear Gunner

(IL-2 continued)

At a Glance:

Engine:

AM-38F.

Power:

Indicated: 1,575 HP;

Take-off: 1,720 HP

Advantages:

- Effective as torpedo bomber;
- Great crew protection.

Armament:

- 2 x 7.,62mm MG (SHKAS);
- 1 x 12.7mm MG (UBT);
- 4 x RS-82 or 4 x RS-132;
- 1 45-12-AN torpedo.

Disadvantages:

- Vulnerable oil radiator;
- Decreased speed performance.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,000 RPM

Best Cruise: 1,800 RPM

Economy Cruise: 1,700 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- IL-2T is the torpedo version of the IL-2. All guns except two 7.62 machine guns are removed, therefore the only effective means of destroying enemy targets is the single torpedo carried under the fuselage.
- All torpedo runs should be performed at speeds below 350 km/h and altitudes under 100 meters. Torpedoes are best dropped from 500 meters or more away from flak-equipped ships.
- After attack immediately turn back and fly home at low level.

ИИ-21



Type: Heavy Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|-------------------------------|----|-------------------------------------|
| 1 | Airspeed Indicator | 10 | Manifold Pressure |
| 2 | Compass | 11 | Coolant Temperature |
| 3 | Variometer | 12 | RPM Indicator |
| 4 | Altimeter | 13 | Oil Pressure |
| 5 | Turn & Bank Indicator | 14 | Oil Temp & Pressure; Fuel Pressure |
| 6 | Artificial Horizon | 15 | Fuel Level |
| 7 | Clock | 16 | Brake Pressure |
| 8 | Ammeter | 17 | Air Pressure |
| 9 | Landing Gear Indicator Lights | 18 | Gear Position Indicator (not shown) |

(IL-2 continued)

At a Glance:

Engine:

AM-38F.

Power:

Indicated: 1,575 HP;

Take-off: 1,720 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 2 x 23mm cannon (VYa).

Advantages:

- Strong armor and firepower;
- Increased aircraft durability;
- Easy to fly;
- Excellent against enemy bombers.

Disadvantages:

- Insufficient maneuverability and speed for opposing high-speed fighters;
- No rear gunner;
- Vulnerable oil radiator.

Pilot Notes:

Take-Off Speed: 150 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,100 RPM

Best Cruise: 1,800 RPM

Economy Cruise: 1,600 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- IL-2I is the heavy interceptor version of the IL-2 ground attack.
- The onboard armament is brutally effective against all air targets. IL-2's armor is also very effective at stopping small-caliber rounds of bomber defensive gunners.
- The only problems with IL-2 as a fighter is its weight, speed and maneuverability. It's significantly inferior in those aspects to all dedicated fighters, and therefore regular anti-bomber tactics cannot generally be used.
- A good tactic is to set convergence to 400-500 meters and fire at bombers from beyond their effective defensive fire range. Otherwise IL-2I can attack bombers directly from behind at speeds at least 50 km/h greater than the bombers', then extend ahead of the formation, turn around and attack head-on. During such attacks airspeed should be watched constantly: IL-2I does not accelerate that well and therefore if you let yourself get too slow you may never catch up to the enemy's fast bombers.
- In combat against enemy fighters IL-2I is generally at a disadvantage. Use energy tactics in the horizontal plane. Causing the enemy to overshoot, or extending and attacking head-on are the best tactics.

IL-10



Type: Sturmovik

Major Users: USSR

Cockpit Guide:



- | | |
|---|--|
| 1 Airspeed Indicator | 11 <i>RPM Indicator</i> |
| 2 Compass | 12 <i>Oil Temperature</i> |
| 3 Altimeter | 13 <i>Coolant Temperature</i> |
| 4 <i>Variometer</i> | 14 <i>Oil Radiator Indicator</i> |
| 5 <i>Artificial Horizon</i> | 15 <i>Water Radiator Indicator</i> |
| 6 <i>Ammeter</i> | 16 <i>Manifold Pressure</i> |
| 7 <i>Ammunition Counters & Warning Lights</i> | 17 <i>Oil Temp & Pressure; Fuel Pressure</i> |
| 8 <i>Landing Gear Indicator Lights</i> | 18 Fuel Level |
| 9 <i>Pilot's Direction Indicator</i> | 19 <i>Brake Pressure</i> |
| 10 <i>Clock</i> | 20 <i>Air Pressure</i> |

Other Playable Crew Positions:



Rear Gunner

(II-10 continued)

At a Glance:

Engine:

1 x Mikulin AM-42

Power:

Indicated: 1,750 HP

Take-off: 2,000 HP

Armament:

- 2 x 23 mm NS-23 cannon
- 2 x 12,7 mm ShKAS MGs
- 1 x 12,7 mm Berezin UBT MG (defensive)
- Up to 600 kg of bombs and rockets.

Advantages:

- Exceptional top speed for an attack aircraft;
- Excellent maneuverability;
- Strong on-board armament.

Disadvantages:

- Light bomb load;
- Difficult take-offs and landings compared to the II-2.

Pilot Notes:

- The aircraft is equipped with a single-step supercharger, therefore no pilot intervention is needed.
- Mixture adjustment is required at 6,600 meters.

LaGG-3, 1941 4 Series



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|----------------------------------|
| 1 | Clock | 13 | Pilot's Direction Indicator |
| 2 | Brake Pressure | 14 | Oil Temperature |
| 3 | Air Pressure | 15 | RPM Indicator |
| 4 | Altimeter | 16 | Fuel Level |
| 5 | Compass | 17 | Magneto |
| 6 | Radio | 18 | Internal System Indicator |
| 7 | Manifold Pressure | 19 | Landing Gear Indicator Lights |
| 8 | Oil Temp & Pressure; Fuel Pressure | 20 | Ammeter |
| 9 | Voltmeter | 21 | Oxygen Apparatus |
| 10 | Airspeed Indicator | 22 | Air Pressure |
| 11 | Turn & Bank Indicator | 23 | Brake Pressure |
| 12 | Variometer | 24 | Engine Temperature Warning Light |

(LaGG-3 continued)

At a Glance:

Engine:

M-105P.

Power: 1,050 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 1 x 12.7mm MG (BS);
- 1 x 20mm cannon (ShVAK).

Advantages:

- Excellent performance characteristics for that time period;
- Good maneuverability and strong armament;
- Long range;
- Increased aircraft durability.

Disadvantages:

- Multiple changes during large-scale production;
- Low quality of external surfaces, non-retractable tail wheel leading to reduced speed;
- Poor rear visibility;
- First serial planes prone to fall into spin eliminated in 1941 with the introduction of automatic leading edge slats;
- Quick loss of speed in sustained maneuver.

Pilot Notes:

Take-Off Speed: 150 km/h

Landing Speed: 140 km/h

Combat Engine Setting: 2,750 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,100 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- LaGG-3 is somewhat inferior to contemporary German fighters, however in capable hands it can win a fight against almost any opponent.
- The key to winning aerial combat with the LaGG is to get the German fighter to slow down and commit to a turning fight or rolling scissors. These fights are LaGG's strong point and Germans will usually lose. In vertical combat LaGG is inadequate and will usually be brought down easily.
- LaGG-3 is a stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds need to be switched at around 3,000 meters. Best performance altitude is between 1,000 and 2,500 meters. Worst performance above 4,000 meters

LaGG-3, 1942 29 Series



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|----------------------------------|
| 1 | Clock | 13 | Pilot's Direction Indicator |
| 2 | Brake Pressure | 14 | Oil Temperature |
| 3 | Air Pressure | 15 | RPM Indicator |
| 4 | Altimeter | 16 | Fuel Level |
| 5 | Compass | 17 | Magneto |
| 6 | Radio | 18 | Internal System Indicator |
| 7 | Manifold Pressure | 19 | Landing Gear Indicator Lights |
| 8 | Oil Temp & Pressure; Fuel Pressure | 20 | Ammeter |
| 9 | Voltmeter | 21 | Oxygen Apparatus |
| 10 | Airspeed Indicator | 22 | Air Pressure |
| 11 | Turn & Bank Indicator | 23 | Brake Pressure |
| 12 | Variometer | 24 | Engine Temperature Warning Light |

(LaGG-3 continued)

At a Glance:

Engine:

M-105P.

Power: 1,050 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 1 x 12.7mm MG (BS);
- 1 x 20mm cannon (ShVAK).

Advantages:

- Excellent performance characteristics for that time period;
- Good maneuverability and strong armament;
- Long range;
- Increased aircraft durability.

Disadvantages:

- Multiple changes during large-scale production;
- Low quality of external surfaces, non-retractable tail wheel leading to reduced speed;
- Poor rear visibility;
- First serial planes prone to fall into spin eliminated in 1941 with the introduction of automatic leading edge slats;
- Quick loss of speed in sustained maneuver.

Pilot Notes:

Take-Off Speed: 150 km/h

Landing Speed: 140 km/h

Combat Engine Setting: 2,750 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,100 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- LaGG-3 is somewhat inferior to contemporary German fighters, however in capable hands it can win a fight against almost any opponent.
- The key to winning aerial combat with the LaGG is to get the German fighter to slow down and commit to a turning fight or rolling scissors. These fights are LaGG's strong point and Germans will usually lose. In vertical combat LaGG is inadequate and will usually be brought down easily.
- LaGG-3 is a stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds need to be switched at around 3,000 meters. Best performance altitude is between 1,000 and 2,500 meters. Worst performance above 4,000 meters

LaGG-3, 1942 35 Series



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|----------------------------------|
| 1 | Clock | 13 | Pilot's Direction Indicator |
| 2 | Brake Pressure | 14 | Oil Temperature |
| 3 | Air Pressure | 15 | RPM Indicator |
| 4 | Altimeter | 16 | Fuel Level |
| 5 | Compass | 17 | Magneto |
| 6 | Radio | 18 | Internal System Indicator |
| 7 | Manifold Pressure | 19 | Landing Gear Indicator Lights |
| 8 | Oil Temp & Pressure; Fuel Pressure | 20 | Ammeter |
| 9 | Voltmeter | 21 | Oxygen Apparatus |
| 10 | Airspeed Indicator | 22 | Air Pressure |
| 11 | Turn & Bank Indicator | 23 | Brake Pressure |
| 12 | Variometer | 24 | Engine Temperature Warning Light |

(LaGG-3 continued)

At a Glance:

Engine:

M-105P.

Power: 1,050 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 1 x 12.7mm MG (BS);
- 1 x 20mm cannon (ShVAK).

Advantages:

- Excellent performance characteristics for that time period;
- Good maneuverability and strong armament;
- Long range;
- Increased aircraft durability.

Disadvantages:

- Multiple changes during large-scale production;
- Low quality of external surfaces, non-retractable tail wheel leading to reduced speed;
- Poor rear visibility;
- First serial planes prone to fall into spin eliminated in 1941 with the introduction of automatic leading edge slats;
- Quick loss of speed in sustained maneuver.

Pilot Notes:

Take-Off Speed: 150 km/h

Landing Speed: 140 km/h

Combat Engine Setting: 2,750 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,100 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- LaGG-3 is somewhat inferior to contemporary German fighters, however in capable hands it can win a fight against almost any opponent.
- The key to winning aerial combat with the LaGG is to get the German fighter to slow down and commit to a turning fight or rolling scissors. These fights are LaGG's strong point and Germans will usually lose. In vertical combat LaGG is inadequate and will usually be brought down easily.
- LaGG-3 is a stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds need to be switched at around 3,000 meters. Best performance altitude is between 1,000 and 2,500 meters. Worst performance above 4,000 meters

LaGG-3, 1943 66 Series



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|----------------------------------|
| 1 | Clock | 12 | Turn & Bank Indicator |
| 2 | Airspeed Indicator | 13 | Variometer |
| 3 | RPM Indicator | 14 | Oil Temperature |
| 4 | Fuel Level | 15 | Ammeter |
| 5 | Altimeter | 16 | Oxygen Apparatus |
| 6 | Compass | 17 | Magneto |
| 7 | Manifold Pressure | 18 | Internal System Indicator |
| 8 | Oil Temp & Pressure; Fuel Pressure | 19 | Landing Gear Indicator Lights |
| 9 | Voltmeter | 20 | Air Pressure |
| 10 | Radio | 21 | Brake Pressure |
| 11 | Pilot's Direction Indicator | 22 | Engine Temperature Warning Light |

(LaGG-3 continued)

At a Glance:

Engine:

M-105PF.

Power: 1,180 HP

Armament:

- 1 x 12.7mm MG (BS);
- 1 x 20mm Cannon (ShVAK).

Advantages:

- Excellent aircraft flight performance;
- Good maneuverability and strong armament;
- Increased aircraft durability.

Disadvantages:

- Insufficient rear visibility;
- Quick loss of speed in sustained maneuver.

Pilot Notes:

Take-Off Speed: 150 km/h

Landing Speed: 140 km/h

Combat Engine Setting: 2,750 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,100 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- LaGG-3 is somewhat inferior to contemporary German fighters, however in capable hands it can win a fight against almost any opponent.
- The key to winning aerial combat with the LaGG is to get the German fighter to slow down and commit to a turning fight or rolling scissors. These fights are LaGG's strong point and Germans will usually lose. In vertical combat LaGG is inadequate and will usually be brought down easily.
- LaGG-3 is a stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds need to be switched at around 3,000 meters. Best performance altitude is between 1,000 and 2,500 meters. Worst performance above 4,000 meters

LaGG-3IT



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|----------------------------------|
| 1 | Clock | 12 | Turn & Bank Indicator |
| 2 | Airspeed Indicator | 13 | Variometer |
| 3 | RPM Indicator | 14 | Oil Temperature |
| 4 | Fuel Level | 15 | Ammeter |
| 5 | Altimeter | 16 | Oxygen Apparatus |
| 6 | Compass | 17 | Magneto |
| 7 | Manifold Pressure | 18 | Internal System Indicator |
| 8 | Oil Temp & Pressure; Fuel Pressure | 19 | Landing Gear Indicator Lights |
| 9 | Voltmeter | 20 | Air Pressure |
| 10 | Radio | 21 | Brake Pressure |
| 11 | Pilot's Direction Indicator | 22 | Engine Temperature Warning Light |

(LaGG-3IT continued)

At a Glance:

Engine:

M-105PF.

Power: 1,180 HP

Armament:

- 1 x 12.7mm (BS);
- 1 x 37mm (NS-37).

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability.

Disadvantages:

- Insufficient rear cockpit visibility;
- Quick loss of speed in long-drawn maneuvers;
- Insufficient maximum speed for the year 1943.

Pilot Notes:

Take-Off Speed: 150 km/h

Landing Speed: 140 km/h

Combat Engine Setting: 2,750 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,100 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- LaGG-3 is somewhat inferior to contemporary German fighters, however in capable hands it can win a fight against almost any opponent.
- The key to winning aerial combat with the LaGG is to get the German fighter to slow down and commit to a turning fight or rolling scissors. These fights are LaGG's strong point and Germans will usually lose. In vertical combat LaGG is inadequate and will usually be brought down easily.
- LaGG-3 is a stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters. LaGG-3IT is equipped with a rapid firing 37mm cannon which can be absolutely brutal against both air and ground targets.
- Supercharger speeds need to be switched at around 3,000 meters. Best performance altitude is between 1,000 and 2,500 meters. Worst performance above 4,000 meters

LaGG-3RD



Type: Rocket Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|-----------------------------|----|----------------------------------|
| 1 | Clock | 12 | Turn & Bank Indicator |
| 2 | Airspeed Indicator | 13 | Variometer |
| 3 | Fuel Pressure | 14 | Oil Temperature |
| 4 | Oil Pressure | 15 | Ammeter |
| 5 | Fuel Level | 16 | Voltmeter |
| 6 | Radio | 17 | Internal System Indicator |
| 7 | Altimeter | 18 | Landing Gear Indicator Lights |
| 8 | Compass | 19 | Air Pressure |
| 9 | Exhaust Pressure | 20 | Brake Pressure |
| 10 | RPM Indicator | 21 | Oxygen Apparatus |
| 11 | Pilot's Direction Indicator | 22 | Engine Temperature Warning Light |

Pilot Notes:

- Based on modern calculations, the projected engine power would be insufficient to reach even 700 km/h, much less the supposed 1,000 km/h listed by the original designers.
- We've therefore had to slightly increase the engine power, to make the plane at least slightly faster than the piston-powered mid-war La-5 design.

La-5



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|---------------------------------|
| 1 | Clock | 11 | Pilot's Direction Indicator |
| 2 | Airspeed Indicator | 12 | Turn & Bank Indicator |
| 3 | RPM Indicator | 13 | Variometer |
| 4 | Fuel Level | 14 | Oil Temperature |
| 5 | Altimeter | 15 | Ammeter |
| 6 | Compass | 16 | Radio |
| 7 | Manifold Pressure | 17 | Brake Pressure |
| 8 | Oil Temp & Pressure; Fuel Pressure | 18 | Magneto |
| 9 | Voltmeter | 19 | Landing Gear Indicator Lights |
| 10 | Radio | 20 | External Ordnance Status Lights |

(La-5 continued)

At a Glance:

Engine:

M-82

Power: 1,700 HP

Armament:

- 2 x 20mm cannons (ShVAK)

Advantages:

- Good performance characteristics;
- Good maneuverability and strong armament;
- Good cockpit visibility.

Disadvantages:

- Heavy weight;
- Wooden construction of the first serial aircraft.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 165 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 1,950 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- La-5 is somewhat inferior to contemporary German fighters, however in capable hands it can win a fight against almost any opponent. In general these radial versions of the LaGG-3 are less capable than the 1943 version of the LaGG.
- LaGG-3 tactics and considerations to aerial combat apply to the La-5 as well. La-5 is an excellent gunnery platform as its twin ShVAK cannon are installed in the nose and therefore are effective at any range regardless of convergence at distances up to 300 meters for fighters, and 500 meters for bombers.
- Supercharger speeds need to be switched at around 3,500 meters. Second speed can be used on take-off, however needs to be switched off at 100-150 meters.
- Best performance altitude is between 1,000 and 2,500 meters. Worst performance above 4,000 meters

La-5F



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|---------------------------------|
| 1 | Clock | 11 | Pilot's Direction Indicator |
| 2 | Airspeed Indicator | 12 | Turn & Bank Indicator |
| 3 | RPM Indicator | 13 | Variometer |
| 4 | Fuel Level | 14 | Oil Temperature |
| 5 | Altimeter | 15 | Ammeter |
| 6 | Compass | 16 | Radio |
| 7 | Manifold Pressure | 17 | Brake Pressure |
| 8 | Oil Temp & Pressure; Fuel Pressure | 18 | Magneto |
| 9 | Voltmeter | 19 | Landing Gear Indicator Lights |
| 10 | Radio | 20 | External Ordnance Status Lights |

(La-5F continued)

At a Glance:

Engine:

M-82F

Power: 1,700 HP

Armament:

- 2 x 20mm cannons (ShVAK)

Advantages:

- Very good performance characteristics at low-mid altitudes;
- Good maneuverability and strong armament;
- Good cockpit visibility;
- Increased aircraft durability.

Disadvantages:

- Heavy weight;
- Wooden construction of the first serial aircraft.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 165 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 1,950 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- La-5 is somewhat inferior to contemporary German fighters, however in capable hands it can win a fight against almost any opponent. In general these radial versions of the LaGG-3 are less capable than the 1943 version of the LaGG.
- LaGG-3 tactics and considerations to aerial combat apply to the La-5 as well. La-5 is an excellent gunnery platform as its twin ShVAK cannon are installed in the nose and therefore are effective at any range regardless of convergence at distances up to 300 meters for fighters, and 500 meters for bombers.
- Supercharger speeds need to be switched at around 3,500 meters. Second speed can be used on take-off, however needs to be switched off at 100-150 meters.
- Best performance altitude is between 1,000 and 2,500 meters. Worst performance above 4,000 meters

La-5FN



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|---------------------------------|
| 1 | Clock | 11 | Pilot's Direction Indicator |
| 2 | Airspeed Indicator | 12 | Turn & Bank Indicator |
| 3 | RPM Indicator | 13 | Variometer |
| 4 | Fuel Level | 14 | Oil Temperature |
| 5 | Altimeter | 15 | Ammeter |
| 6 | Compass | 16 | Radio |
| 7 | Manifold Pressure | 17 | Brake Pressure |
| 8 | Oil Temp & Pressure; Fuel Pressure | 18 | Magneto |
| 9 | Voltmeter | 19 | Landing Gear Indicator Lights |
| 10 | Radio | 20 | External Ordnance Status Lights |

(La-5FN continued)

At a Glance:

Engine:

M-82FN.

Power: 1,850 HP

Armament:

- 2 x 20mm cannon (ShVAK).

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Good cockpit visibility;
- Increased aircraft durability.

Disadvantages:

- Heavy weight;
- Wooden construction of the first serial aircraft.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: Yes, 10 minute maximum

Supercharger: Two-Speed

- Excellent dogfighter with good all-around performance. Can be used both as an energy or angles fighter against BF-109s up to G6, and all FW-190A and F. Best used as angles fighter against later 109s, FW-190D and Me-262.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Even though equipped with radial engine, the La-5FN can easily overheat in combat especially when using boost. Make sure to fully open the radiator as soon as you can afford losing speed.
- La-5FN will not easily stall at slow speeds due to the leading edge slats, however you can enter a vicious high-speed spin if you yank the stick too hard at speeds above 400 km/h.
- Supercharger speeds need to be switched at 4,500 meters. La-5FN will not perform well at all at higher altitudes and speed 1; at lower altitudes and speed 2 engine damage will occur.
- Best performance altitude is between 1,500 and 2,800 meters for speed 1 and 4,500 and 6,500 for speed 2.
- Worst performance between 3,000 and 4,500 meters/

La-7



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|---------------------------------|
| 1 | Clock | 11 | Fuel Level |
| 2 | Altimeter | 12 | Oil Temperature |
| 3 | Compass | 13 | Air Pressure |
| 4 | Pilot's Direction Indicator | 14 | Brake Pressure |
| 5 | Airspeed Indicator | 15 | Oxygen Flow Indicator |
| 6 | Turn & Bank Indicator | 16 | Oxygen Pressure |
| 7 | Variometer | 17 | Landing Gear Indicator Lights |
| 8 | Manifold Pressure | 18 | Ammeter |
| 9 | RPM Indicator | 19 | External Ordnance Status Lights |
| 10 | Oil Temp & Pressure; Fuel Pressure | 20 | Voltmeter |

(La-7 continued)

At a Glance:

Engine:

ASh-82FN.

Power: 1,850 HP

Armament:

- 2 x 20mm cannon (ShVAK)

Advantages:

- One of the best late-war fighters;
- Improved aerodynamics;
- Good maneuverability and strong armament. Increased aircraft durability;
- Easy to fly.

Disadvantages:

- The quality of manufacture slightly inferior to late-war Yak fighters.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Excellent fighter with great all-around performance. Clearly superior in one-on-one dogfights to most pre-1944 fighters of the world in both energy and angles tactics. Outstanding climb, acceleration and diving characteristics.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Even though equipped with radial engine, the La-7 can easily overheat in combat especially when using boost. Make sure to fully open the radiator as soon as you can afford losing speed.
- La-7 will not easily stall at slow speeds due to the leading edge slats, however you can enter a vicious high-speed spin if you yank the stick too hard at speeds above 400 km/h.
- Supercharger speeds need to be switched at 4,500 meters. La-7 will not perform well at all at higher altitudes and speed 1; at lower altitudes and speed 2 engine damage will occur.
- Best performance altitude is between 1,500 and 2,800 meters for speed 1 and 4,500 and 6,500 for speed 2.
- Worst performance between 3,000 and 4,500 meters.

La-7 3xB-20



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|---------------------------------|
| 1 | Clock | 12 | Ammeter |
| 2 | Altimeter | 13 | Fuel Level |
| 3 | Compass | 14 | Oil Temperature |
| 4 | Pilot's Direction Indicator | 15 | Landing Gear Indicator Lights |
| 5 | Airspeed Indicator | 16 | Magneto |
| 6 | Turn & Bank Indicator | 17 | Voltmeter |
| 7 | Variometer | 18 | Oxygen Flow Indicator |
| 8 | Manifold Pressure | 19 | Oxygen Pressure |
| 9 | RPM Indicator | 20 | Air Pressure |
| 10 | Oil Temp & Pressure; Fuel Pressure | 21 | Brake Pressure |
| 11 | Pilot's Direction Indicator | 22 | External Ordnance Status Lights |

(La-7 continued)

At a Glance:

Engine:

ASh-82FN.

Power: 1,850 HP

Armament:

- 3 x 20mm cannon (B-20)

Advantages:

- One of the best late-war fighters;
- Improved aerodynamics;
- Good maneuverability and strong armament. Increased aircraft durability;
- Easy to fly;
- Powerful armament.

Disadvantages:

- The quality of manufacture slightly inferior to late-war Yak fighters.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Excellent fighter with great all-around performance. Clearly superior in one-on-one dogfights to most pre-1944 fighters of the world in both energy and angles tactics. Outstanding climb, acceleration and diving characteristics.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Even though equipped with radial engine, the La-7 can easily overheat in combat especially when using boost. Make sure to fully open the radiator as soon as you can afford losing speed.
- La-7 will not easily stall at slow speeds due to the leading edge slats, however you can enter a vicious high-speed spin if you yank the stick too hard at speeds above 400 km/h.
- Supercharger speeds need to be switched at 4,500 meters. La-7 will not perform well at all at higher altitudes and speed 1; at lower altitudes and speed 2, engine damage will occur.
- Best performance altitude is between 1,500 and 2,800 meters for speed 1 and 4,500 and 6,500 for speed 2.
- Worst performance between 3,000 and 4,500 meters.

La-7R



Type: Mixed Power Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|-------------------------------------|
| 1 | Clock | 13 | Air Pressure |
| 2 | Altimeter | 14 | Brake Pressure |
| 3 | Compass | 15 | Oxygen Flow Indicator |
| 4 | Pilot's Direction Indicator | 16 | Oxygen Pressure |
| 5 | Airspeed Indicator | 17 | Landing Gear Indicator Lights |
| 6 | Turn & Bank Indicator | 18 | Ammeter |
| 7 | Variometer | 19 | External Ordnance Status Lights |
| 8 | Manifold Pressure (Piston Engine) | 20 | Voltmeter |
| 9 | RPM Indicator (Piston Engine) | 21 | Fuel Level (Rocket Engine) |
| 10 | Oil Temp & Pressure; Fuel Pressure | 22 | Fuel Level (Rocket Engine) |
| 11 | Fuel Level (Piston Engine) | 23 | Exhaust Temperature (Rocket Engine) |
| 12 | Oil Temperature (Piston Engine) | | |

(La-7R continued)

At a Glance:

Engine:

1 x Shvetzov ASh-FN
2 x Glushkov RD-1 x 3

Power: 1 x 1,850 HP;
2 x 300 kg/s at sea level

Armament:

- 2 x 20mm ShVAK cannon

Advantages:

- Excellent maneuverability;
- Strong armament.

Disadvantages:

- Unreliable rocket engine;
- Insufficient time of flight.

Pilot Notes:

- Excellent fighter with great all-around performance, especially in energy tactics. Outstanding climb, acceleration and diving characteristics. Slightly inferior to the La-7 in maneuvering fights due to increased weight.
- The rocket engine has limited throttle control. The piston engine operation is the same as on the regular La-7.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- The radial engine can easily overheat in combat, especially when using boost. Make sure to fully open the radiator as soon as you can afford losing speed.
- La-7 will not easily stall at slow speeds due to the leading edge slats, however you can enter a vicious high-speed spin if you yank the stick too hard at speeds above 400 km/h.
- Piston engine's supercharger speeds need to be switched at 4,500 meters.
- Best performance altitude is between 1,500 and 2,800 meters for speed 1 and 4,500 and 6,500 for speed 2.
- Worst performance between 3,000 and 4,500 meters.

MiG-3



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 10 | Voltmeter |
| 2 | Compass | 11 | Air Pressure |
| 3 | Manifold Pressure | 12 | Brake Pressure |
| 4 | Fuel Level | 13 | Coolant Temperature |
| 5 | Airspeed Indicator | 14 | Oil Temperature |
| 6 | Turn & Bank Indicator | 15 | Landing Gear Indicator Lights |
| 7 | Variometer | 16 | Clock |
| 8 | RPM Indicator | 17 | Ammeter |
| 9 | Oil Temp & Pressure; Fuel Pressure | | |

(MiG-3 continued)

At a Glance:

Engine:

AM-35A

Power:

Indicated: 1,200 HP

Take-off: 1,350 HP

Armament:

- 2 x 12.7mm MG (BS)

Advantages:

- Fastest high-altitude interceptor of 1941;
- Stable gun platform;
- Excellent maneuverability at high angles of attack;
- Good maneuverability at high altitudes;
- Practical easy-to-build, easy-to-maintain construction.

Disadvantages:

- Weakly armored;
- High landing speed;
- Insufficient maneuverability at low altitudes.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 1,850 RPM

Economy Cruise: 1,750 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- MiG-3 1941 versions are generally inferior to all 1941 and 1942 fighters, and inadequate against all 1943 and later fighters.
- MiG-3's low altitude performance is ferocious and it should never be used as an angles fighter below 5,000 meters.
- MiG-3 will easily stall at lower altitudes from rough maneuvers. It should be flown very gently.
- Most MiG-3 variants have very weak armament and usually need a two-three second burst at a vulnerable area to bring down a target.
- Best performance altitude is above 4,500 meters. Worst performance under 1,000 meters

MiG-3 2xShVAK



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 10 | Voltmeter |
| 2 | Compass | 11 | Air Pressure |
| 3 | Manifold Pressure | 12 | Brake Pressure |
| 4 | Fuel Level | 13 | Coolant Temperature |
| 5 | Airspeed Indicator | 14 | Oil Temperature |
| 6 | Turn & Bank Indicator | 15 | Landing Gear Indicator Lights |
| 7 | Variometer | 16 | Clock |
| 8 | RPM Indicator | 17 | Ammeter |
| 9 | Oil Temp & Pressure; Fuel Pressure | | |

(MiG-3 continued)

At a Glance:

Engine:

AM-35A

Power:

Indicated: 1,200 HP

Take-off: 1,350 HP

Armament:

- 2 x 20mm (ShVAK)

Advantages:

- Fastest high-altitude interceptor of 1941;
- Stable gun platform;
- Excellent maneuverability at high angles of attack;
- Good maneuverability at high altitudes;
- Practical easy-to-build, easy-to-maintain construction.

Disadvantages:

- Weakly armored;
- High landing speed;
- Insufficient maneuverability at low altitudes.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 1,850 RPM

Economy Cruise: 1,750 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- MiG-3 1941 versions are generally inferior to all 1941 and 1942 fighters, and inadequate against all 1943 and later fighters.
- MiG-3's low altitude performance is ferocious and it should never be used as an angles fighter below 5,000 meters.
- MiG-3 will easily stall at lower altitudes from rough maneuvers. It should be flown very gently.
- Most MiG-3 variants have very weak armament and usually need a two-three second burst at a vulnerable area to bring down a target.
- Best performance altitude is above 4,500 meters. Worst performance under 1,000 meters

MiG-3 2xUB



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 10 | Voltmeter |
| 2 | Compass | 11 | Air Pressure |
| 3 | Manifold Pressure | 12 | Brake Pressure |
| 4 | Fuel Level | 13 | Coolant Temperature |
| 5 | Airspeed Indicator | 14 | Oil Temperature |
| 6 | Turn & Bank Indicator | 15 | Landing Gear Indicator Lights |
| 7 | Variometer | 16 | Clock |
| 8 | RPM Indicator | 17 | Ammeter |
| 9 | Oil Temp & Pressure; Fuel Pressure | | |

(MiG-3 continued)

At a Glance:

Engine:

AM-35A

Power:

Indicated: 1,200 HP

Take-off: 1,350 HP

Armament:

- 2 x 12.7 UB MG

Advantages:

- Fastest high-altitude interceptor of 1941;
- Stable gun platform;
- Excellent maneuverability at high angles of attack;
- Good maneuverability at high altitudes;
- Practical, easy-to-build, easy-to-maintain construction.

Disadvantages:

- Weakly armored;
- High landing speed;
- Insufficient maneuverability at low altitudes.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 1,850 RPM

Economy Cruise: 1,750 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- MiG-3 1941 versions are generally inferior to all 1941 and 1942 fighters, and inadequate against all 1943 and later fighters.
- MiG-3's low altitude performance is ferocious and it should never be used as an angles fighter below 5,000 meters.
- MiG-3 will easily stall at lower altitudes from rough maneuvers. It should be flown very gently.
- Most MiG-3 variants have very weak armament and usually need a two-three second burst at a vulnerable area to bring down a target.
- Best performance altitude is above 4,500 meters. Worst performance under 1,000 meters

MiG-3 AM-38



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 10 | Voltmeter |
| 2 | Compass | 11 | Air Pressure |
| 3 | Manifold Pressure | 12 | Brake Pressure |
| 4 | Fuel Level | 13 | Coolant Temperature |
| 5 | Airspeed Indicator | 14 | Oil Temperature |
| 6 | Turn & Bank Indicator | 15 | Landing Gear Indicator Lights |
| 7 | Variometer | 16 | Clock |
| 8 | RPM Indicator | 17 | Ammeter |
| 9 | Oil Temp & Pressure; Fuel Pressure | | |

(MiG-3 continued)

At a Glance:

Engine:

AM-38

Power:

Indicated: 1,500 HP

Take-off: 1,665HP

Armament:

- 2 x 12.7mm MG (BS)
- 2 x 7.62mm MG (ShKAS)

Advantages:

- Fastest high-altitude interceptor of 1941;
- Stable gun platform;
- Excellent maneuverability at high angles of attack;
- Good maneuverability at high altitudes;
- Practical, easy-to-build, easy-to-maintain construction.

Disadvantages:

- High landing speed;
- Insufficient maneuverability at low altitudes.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 1,850 RPM

Economy Cruise: 1,750 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- MiG-3 1941 versions are generally inferior to all 1941 and 1942 fighters, and inadequate against all 1943 and later fighters.
- MiG-3's low altitude performance is ferocious and it should never be used as an angles fighter below 5,000 meters.
- MiG-3 will easily stall at lower altitudes from rough maneuvers. It should be flown very gently.
- Most MiG-3 variants have very weak armament and usually need a two-three second burst at a vulnerable area to bring down a target.
- Best performance altitude is above 4,500 meters. Worst performance under 1,000 meters

MiG-3UD



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 10 | Voltmeter |
| 2 | Compass | 11 | Air Pressure |
| 3 | Manifold Pressure | 12 | Brake Pressure |
| 4 | Fuel Level | 13 | Coolant Temperature |
| 5 | Airspeed Indicator | 14 | Oil Temperature |
| 6 | Turn & Bank Indicator | 15 | Landing Gear Indicator Lights |
| 7 | Variometer | 16 | Clock |
| 8 | RPM Indicator | 17 | Ammeter |
| 9 | Oil Temp & Pressure; Fuel Pressure | | |

(MiG-3 continued)

At a Glance:

Engine:

AM-35A

Power:

Indicated: 1,200 HP

Take-off: 1,350 HP

Armament:

- 1 x 12.7mm MG (BS)
- 2 x 7.62mm MG (ShKAS)

Advantages:

- Fastest high-altitude interceptor of 1941;
- Stable gun platform;
- Excellent maneuverability at high angles of attack;
- Good maneuverability at high altitudes;
- Practical, easy-to-build, easy-to-maintain construction.

Disadvantages:

- High landing speed;
- Insufficient maneuverability at low altitudes.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 1,850 RPM

Economy Cruise: 1,750 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- MiG-3 1941 versions are generally inferior to all 1941 and 1942 fighters, and inadequate against all 1943 and later fighters.
- MiG-3's low altitude performance is ferocious and it should never be used as an angles fighter below 5,000 meters.
- MiG-3 will easily stall at lower altitudes from rough maneuvers. It should be flown very gently.
- Most MiG-3 variants have very weak armament and usually need a two-three second burst at a vulnerable area to bring down a target.
- Best performance altitude is above 4,500 meters. Worst performance under 1,000 meters

MiG-3U



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 10 | Voltmeter |
| 2 | Compass | 11 | Air Pressure |
| 3 | Manifold Pressure | 12 | Brake Pressure |
| 4 | Fuel Level | 13 | Coolant Temperature |
| 5 | Airspeed Indicator | 14 | Oil Temperature |
| 6 | Turn & Bank Indicator | 15 | Landing Gear Indicator Lights |
| 7 | Variometer | 16 | Clock |
| 8 | RPM Indicator | 17 | Ammeter |
| 9 | Oil Temp & Pressure; Fuel Pressure | | |

(MiG-3 continued)

At a Glance:

Engine:

AM-35A

Power:

Indicated: 1,200 HP

Take-off: 1,350 HP

Armament:

- 2 x 20 mm cannons (ShVAK).

Advantages:

- Stable gun platform;
- Excellent maneuverability at high angles of attack;
- Good maneuverability at high altitudes;
- Practical, easy-to-build, easy-to-maintain construction.

Disadvantages:

- High landing speed;
- Insufficient maneuverability at low altitudes.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 1,850 RPM

Economy Cruise: 1,750 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- MiG-3's low altitude performance is ferocious and it should never be used as an angles fighter below 5,000 meters.
- MiG-3 will easily stall at lower altitudes from rough maneuvers. It should be flown very gently.
- Most MiG-3 variants have very weak armament and usually need a two-three second burst at a vulnerable area to bring down a target.
- Best performance altitude is above 4,500 meters. Worst performance under 1,000 meters

MiG-9 I-300



Type: Jet Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|---------------------------------|----|---------------------------------|
| 1 | Airspeed Indicator | 16 | Exhaust Temperature (Engine #2) |
| 2 | Artificial Horizon | 17 | Fuel Level (Right) |
| 3 | Variometer | 18 | Oxygen Flow Indicator |
| 4 | Altimeter | 19 | Oxygen Quantity |
| 5 | Compass | 20 | Landing Gear Indicator Lights |
| 6 | Pilot's Direction Indicator | 21 | Fuel Selector Switch |
| 7 | Clock | 22 | Fuel Selector Switch |
| 8 | RPM Indicator (Engine #1) | 23 | Fuel Pressure (Engine #1) |
| 9 | RPM Indicator (Engine #2) | 24 | Fuel Pressure (Engine #2) |
| 10 | Exhaust Pressure (Engine #1) | 25 | Brake Pressure |
| 11 | Oil Pressure (Engine #1) | 26 | Air Pressure |
| 12 | Oil Pressure (Engine #2) | 27 | Hydraulic Pressure |
| 13 | Exhaust Pressure (Engine #2) | 28 | Ammeter |
| 14 | Fuel Level (Left) | 29 | Gun Camera Status Light |
| 15 | Exhaust Temperature (Engine #1) | | |

(MiG-9 continued)

At a Glance:

Engine:

2 x RD-20 (Captured German 003)

Power: 2 x 800 kg / s

Armament:

- 1 x 37mm N-37 cannon (40 shells)
- 2 x 23mm NS-23 cannon (160 shells each)

Advantages:

- Powerful armament;
- Excellent speed characteristics.

Disadvantages:

- Insufficient maneuverability.

Pilot Notes:

- When using the 37mm cannon above 3,000 meters the gun exhaust may get sucked into the engine air intake. Above 6,000 meters using the cannon is prohibited.
Note: this information is different from what may be found in other sources; however it is based on the pilot operating handbook for the MiG-9.
- Please note that the Soviet variant of the 003 engine used for the MiG-9 was not a 1-for-1 copy of the venerable German design. Several modifications were made, most importantly the use of advanced alloys which were unavailable in late-war Germany. This greatly increased the reliability and service life of the engine. Also due to the innovative air intake design, the engine temperature was much less of a problem with the MiG-9 than with the German jets.

MiG-9FS



Type: Jet Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|---------------------------------|----|---------------------------------|
| 1 | Airspeed Indicator | 16 | Exhaust Temperature (Engine #2) |
| 2 | Artificial Horizon | 17 | Fuel Level (Right) |
| 3 | Variometer | 18 | Oxygen Flow Indicator |
| 4 | Altimeter | 19 | Oxygen Quantity |
| 5 | Compass | 20 | Landing Gear Indicator Lights |
| 6 | Pilot's Direction Indicator | 21 | Fuel Selector Switch |
| 7 | Clock | 22 | Fuel Selector Switch |
| 8 | RPM Indicator (Engine #1) | 23 | Fuel Pressure (Engine #1) |
| 9 | RPM Indicator (Engine #2) | 24 | Fuel Pressure (Engine #2) |
| 10 | Exhaust Pressure (Engine #1) | 25 | Brake Pressure |
| 11 | Oil Pressure (Engine #1) | 26 | Air Pressure |
| 12 | Oil Pressure (Engine #2) | 27 | Hydraulic Pressure |
| 13 | Exhaust Pressure (Engine #2) | 28 | Ammeter |
| 14 | Fuel Level (Left) | 29 | Gun Camera Status Light |
| 15 | Exhaust Temperature (Engine #1) | | |

(MiG-9 continued)

At a Glance:

Engine:

2 x RD-20 (Captured German 003)

Power: 2 x 800 kg / s

Armament:

- 1 x 37mm N-37 cannon (40 shells)
- 2 x 23mm NS-23 cannon (160 shells each)

Advantages:

- Powerful armament;
- Excellent speed characteristics.

Disadvantages:

- Insufficient maneuverability.

Pilot Notes:

- When using the 37mm cannon above 3,000 meters the gun exhaust may get sucked into the engine air intake. Above 6,000 meters using the cannon is prohibited.
Note: this information is different from what may be found in other sources; however it is based on the pilot operating handbook for the MiG-9.
- Please note that the Soviet variant of the 003 engine used for the MiG-9 was not a 1-for-1 copy of the venerable German design. Several modifications were made, most importantly the use of advanced alloys which were unavailable in late-war Germany. This greatly increased the reliability and service life of the engine. Also due to the innovative air intake design, the engine temperature was much less of a problem with the MiG-9 than with the German jets.

Mosquito FB MK VI



Type: Fighter-Bomber

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|------------------------------|----|---------------------------------|
| 1 | Airspeed Indicator | 15 | Coolant Temperature (Engine #1) |
| 2 | Artificial Horizon | 16 | Coolant Temperature (Engine #2) |
| 3 | Variometer | 17 | Landing Gear Indicator Lights |
| 4 | Altimeter | 18 | Flap Position Indicator |
| 5 | Turn & Bank Indicator | 19 | Oxygen Apparatus |
| 6 | Pilot's Direction Indicator | 20 | Bomb Door Position Indicator |
| 7 | Boost Cut-Out Switch | 21 | Fuel Level (Inner) |
| 8 | Compass | 22 | Fuel Level (Center) |
| 9 | RPM Indicator (Engine #1) | 23 | Fuel Level (Drop) |
| 10 | RPM Indicator (Engine #2) | 24 | Free Air Temperature |
| 11 | Manifold Pressure(Engine #1) | 25 | Fuel Level (Outer) |
| 12 | Manifold Pressure(Engine #2) | 26 | Oil Pressure (Engine #1) |
| 13 | Oil Temperature (Engine #1) | 27 | Oil Pressure (Engine #2) |
| 14 | Oil Temperature (Engine #2) | 28 | Compass |

P.11C



Type: Fighter

Major Users: Poland

Cockpit Guide:



1 *Compass*

2 *Manifold Pressure*

3 *Oil Temperature (IN)*

4 *Oil Pressure*

5 *Oil Temperature (OUT)*

6 *Fuel Pressure*

7 *Airspeed Indicator*

8 *Turn & Bank Indicator*

9 *Variometer*

10 *RPM Indicator*

11 *Altimeter*

12 *Clock*

At a Glance:

Engine:

PZL VS2

Power: 560 HP

Armament:

- 4 x 7.9 mm PWU wz.33 MGs
- 2 x 12.5 kg bombs.

Advantages:

- Good maneuverability.

Disadvantages:

- Low speed;
- Weak armament.

P-38J



Type: Fighter

Major Users: USA

Cockpit Guide:



- | | | | |
|----|---------------------------|----|---|
| 1 | Clock | 11 | Landing Gear Indicator Lights |
| 2 | Compass | 12 | Manifold Pressure (Engine #1 & #2) |
| 3 | Compass | 13 | RPM Indicator (Engine #1 & #2) |
| 4 | Artificial Horizon | 14 | Oil Temp & Pressure; Fuel Pressure (#1) |
| 5 | Fuel Level (Front) | 15 | Oil Temp & Pressure; Fuel Pressure (#2) |
| 6 | Altimeter | 16 | Ammeter (Engine #1) |
| 7 | Airspeed Indicator | 17 | Ammeter (Engine #2) |
| 8 | Turn & Bank Indicator | 18 | Coolant Temperature (Engine #1 & #2) |
| 9 | Variometer | 19 | Carburetor Air Temp (Engine #1 & #2) |
| 10 | Fuel Level (Rear) | 20 | Oxygen Flow Indicator |

(P-38 continued)

At a Glance:

Engine:

2 x V-1710-89/91

Power: 2 x 1,425 HP at 8,235 m

Armament:

- 1 x 20-mm M2 cannon
- 4 x .50 cal MG 53-2 MGs
- Up to 3,200 lb of bombs
- 10 unguided HVAR rockets

Advantages:

- Fast speed;
- Long range;
- Powerful armament;
- Considerable bomb load.

Disadvantages:

- Problematic control at high speeds, especially when diving (rectified by installation of aileron boosters on J-25 and further variants).

Pilot Notes:

- One of very few twin-engine fighters in the II-2 series, P-38 flown by a dedicated pilot can offer a single-engine driver a few surprises.
- Applying differential power to the two engines can greatly increase turning performance, as well as allow one to perform devastating hammerheads.
- With both engines at the same power, the P-38 has no torque.
- Combat flaps should be used to improve performance during maneuvers.

P-38L



Type: Fighter-Bomber

Major Users: USA

Cockpit Guide:



- | | | | |
|----|---------------------------|----|---|
| 1 | Clock | 11 | Landing Gear Indicator Lights |
| 2 | Compass | 12 | Manifold Pressure (Engine #1 & #2) |
| 3 | Compass | 13 | RPM Indicator (Engine #1 & #2) |
| 4 | Artificial Horizon | 14 | Oil Temp & Pressure; Fuel Pressure (#1) |
| 5 | Fuel Level (Front) | 15 | Oil Temp & Pressure; Fuel Pressure (#2) |
| 6 | Altimeter | 16 | Ammeter (Engine #1) |
| 7 | Airspeed Indicator | 17 | Ammeter (Engine #2) |
| 8 | Turn & Bank Indicator | 18 | Coolant Temperature (Engine #1 & #2) |
| 9 | Variometer | 19 | Carburetor Air Temp (Engine #1 & #2) |
| 10 | Fuel Level (Rear) | 20 | Oxygen Flow Indicator |

(P-38 continued)

At a Glance:

Engine:

2 x V-1710-111/113

Power: 2 x 1,475 HP at 9,150 m

Armament:

- 1 x 20-mm M2 cannon
- 4 x .50 cal MG 53-2 MGs
- Up to 3,200 lb of bombs
- 10 unguided HVAR rockets

Advantages:

- Fast speed;
- Increased maneuverability;
- Long range;
- Powerful armament;
- Considerable bomb load.

Disadvantages:

- Somewhat slower than P-38J.

Pilot Notes:

- One of very few twin-engine fighters in the II-2 series, P-38 flown by a dedicated pilot can offer a single-engine driver a few surprises.
- Applying differential power to the two engines can greatly increase turning performance, as well as allow one to perform devastating hammerheads.
- With both engines at the same power, the P-38 has no torque.
- Combat flaps should be used to improve performance during maneuvers.

P-38L Late



Type: Fighter-Bomber

Major Users: USA

Cockpit Guide:



- | | | | |
|----|---------------------------|----|---|
| 1 | Clock | 11 | Landing Gear Indicator Lights |
| 2 | Compass | 12 | Manifold Pressure (Engine #1 & #2) |
| 3 | Compass | 13 | RPM Indicator (Engine #1 & #2) |
| 4 | Artificial Horizon | 14 | Oil Temp & Pressure; Fuel Pressure (#1) |
| 5 | Fuel Level (Front) | 15 | Oil Temp & Pressure; Fuel Pressure (#2) |
| 6 | Altimeter | 16 | Ammeter (Engine #1) |
| 7 | Airspeed Indicator | 17 | Ammeter (Engine #2) |
| 8 | Turn & Bank Indicator | 18 | Coolant Temperature (Engine #1 & #2) |
| 9 | Variometer | 19 | Carburetor Air Temp (Engine #1 & #2) |
| 10 | Fuel Level (Rear) | 20 | Oxygen Flow Indicator |

(P-38 continued)

At a Glance:

Engine:

2 x V-1710-111/113

Power: 2 x 1,720 HP

Armament:

- 1 x 20-mm M2 cannon
- 4 x .50 cal MG 53-2 MGs
- Up to 3,200 lb of bombs
- 10 unguided HVAR rockets

Advantages:

- Fast speed;
- Increased maneuverability;
- Long range;
- Powerful armament;
- Considerable bomb load.

Disadvantages:

- Somewhat slower than P-38J.

Pilot Notes:

- One of very few twin-engine fighters in the II-2 series, P-38 flown by a dedicated pilot can offer a single-engine driver a few surprises.
- Applying differential power to the two engines can greatly increase turning performance, as well as allow one to perform devastating hammerheads.
- With both engines at the same power, the P-38 has no torque.
- Combat flaps should be used to improve performance during maneuvers.

P-400



Type: Fighter

Major Users: USA; RAF

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 12 | RPM Indicator |
| 2 | Compass | 13 | Clock |
| 3 | Compass | 14 | Oil Pressure |
| 4 | Artificial Horizon | 15 | Carburetor Air Temperature |
| 5 | Airspeed Indicator | 16 | Suction Gauge |
| 6 | Variometer | 17 | De-Ice Switch |
| 7 | Turn & Bank Indicator | 18 | Cylinder Pressure |
| 8 | Manifold Pressure | 19 | Fuel Pressure Warning Light |
| 9 | Coolant Temperature | 20 | Oxygen Flow Indicator |
| 10 | Oil Temp & Pressure; Fuel Pressure | 21 | Landing Gear Indicator Lights |
| 11 | Fuel Level | 22 | Ammeter |

(P-400 continued)

At a Glance:

Engine:

1 x V-1710-35

Power: 1,200 HP

Armament:

- 1 x 20mm cannon (nose)
- 2 x .50 cal machine gun (nose)
- 4 x .30 cal (wings)
- 500 lb bomb

Advantages:

- Reasonably maneuverable at lower altitudes;
- Adequate armament

Disadvantages:

- Performance drop-off at high altitude;
- Poor low-speed handling.

Pilot Notes:

- Adequate dogfighter with good all-around performance.
- The P-39 will easily stall from rough handling, and therefore should be flown very gently especially in horizontal maneuvers.
- It will hold its own against many early fighters, however the Zero and its Japanese counterparts will run circles around the Cobra, while it stalls all over the sky. Avoid turning dogfights with the Japanese planes at all costs.
- P-39 is an very stable gunnery platform. While the wing .50-caliber machine guns are not very effective, the nose 20mm cannon is quite powerful and can bring down most targets in a few hits.
- Best performance altitude is between 1,500 and 3,000 meters. Performance begins to deteriorate above 5,000 meters

P-39D-1



Type: Fighter

Major Users: USA; RAF

Cockpit Guide:



- | | |
|--|---|
| 1 Altimeter | 12 <i>RPM Indicator</i> |
| 2 Compass | 13 <i>Clock</i> |
| 3 <i>Compass</i> | 14 <i>Oil Pressure</i> |
| 4 <i>Artificial Horizon</i> | 15 <i>Carburetor Air Temperature</i> |
| 5 Airspeed Indicator | 16 <i>Suction Gauge</i> |
| 6 <i>Variometer</i> | 17 <i>De-Ice Switch</i> |
| 7 <i>Turn & Bank Indicator</i> | 18 <i>Cylinder Pressure</i> |
| 8 <i>Manifold Pressure</i> | 19 <i>Fuel Pressure Warning Light</i> |
| 9 <i>Coolant Temperature</i> | 20 <i>Oxygen Flow Indicator</i> |
| 10 <i>Oil Temp & Pressure; Fuel Pressure</i> | 21 <i>Landing Gear Indicator Lights</i> |
| 11 Fuel Level | 22 <i>Ammeter</i> |

(P-39D-1 continued)

At a Glance:

Engine:

1 x V-1710-35

Power: 1,200 HP

Armament:

- 1 x 37mm cannon (nose)
- 2 x .50 cal machine gun (nose)
- 4 x .30 cal machine gun (wings)
- 500 lb bomb

Advantages:

- Reasonably maneuverable at lower altitudes;
- Powerful armament

Disadvantages:

- Performance drop-off at high altitude;
- Poor low-speed handling.

Pilot Notes:

- Adequate dogfighter with good all-around performance.
- The P-39 will easily stall from rough handling, and therefore should be flown very gently especially in horizontal maneuvers.
- It will hold its own against many early fighters, however the Zero and its Japanese counterparts will run circles around the Cobra, while it stalls all over the sky. Avoid turning dogfights with the Japanese planes at all costs.
- P-39 is an very stable gunnery platform. While the wing .50-caliber machine guns are not very effective, the nose 20mm cannon is quite powerful and can bring down most targets in a few hits.
- Best performance altitude is between 1,500 and 3,000 meters. Performance begins to deteriorate above 5,000 meters

P-39D-2



Type: Fighter

Major Users: USA; RAF

Cockpit Guide:



- | | | | |
|----|---|----|--------------------------------------|
| 1 | Altimeter | 12 | <i>RPM Indicator</i> |
| 2 | Compass | 13 | <i>Clock</i> |
| 3 | <i>Compass</i> | 14 | <i>Oil Pressure</i> |
| 4 | <i>Artificial Horizon</i> | 15 | <i>Carburetor Air Temperature</i> |
| 5 | Airspeed Indicator | 16 | <i>Suction Gauge</i> |
| 6 | <i>Variometer</i> | 17 | <i>De-Ice Switch</i> |
| 7 | <i>Turn & Bank Indicator</i> | 18 | <i>Cylinder Pressure</i> |
| 8 | <i>Manifold Pressure</i> | 19 | <i>Fuel Pressure Warning Light</i> |
| 9 | <i>Coolant Temperature</i> | 20 | <i>Oxygen Flow Indicator</i> |
| 10 | <i>Oil Temp & Pressure; Fuel Pressure</i> | 21 | <i>Landing Gear Indicator Lights</i> |
| 11 | Fuel Level | 22 | <i>Ammeter</i> |

(P-39D-2 continued)

At a Glance:

Engine:

1 x V-1710-35

Power: 1,200 HP

Armament:

- 1 x 20mm cannon (nose)
- 2 x .50 cal machine gun (nose)
- 4 x .30 cal (wings)
- 500 lb bomb

Advantages:

- Reasonably maneuverable at lower altitudes;
- Adequate armament

Disadvantages:

- Performance drop-off at high altitude;
- Poor low-speed handling.

Pilot Notes:

- Adequate dogfighter with good all-around performance.
- The P-39 will easily stall from rough handling, and therefore should be flown very gently especially in horizontal maneuvers.
- It will hold its own against many early fighters, however the Zero and its Japanese counterparts will run circles around the Cobra, while it stalls all over the sky. Avoid turning dogfights with the Japanese planes at all costs.
- P-39 is an very stable gunnery platform. While the wing .50-caliber machine guns are not very effective, the nose 20mm cannon is quite powerful and can bring down most targets in a few hits.
- Best performance altitude is between 1,500 and 3,000 meters. Performance begins to deteriorate above 5,000 meters

P-39N-1



Type: Fighter

Major Users: USA; USSR

Cockpit Guide:



- | | | | |
|----|---|----|--------------------------------------|
| 1 | Altimeter | 12 | <i>RPM Indicator</i> |
| 2 | Compass | 13 | <i>Clock</i> |
| 3 | <i>Compass</i> | 14 | <i>Oil Pressure</i> |
| 4 | <i>Artificial Horizon</i> | 15 | <i>Carburetor Air Temperature</i> |
| 5 | Airspeed Indicator | 16 | <i>Suction Gauge</i> |
| 6 | <i>Variometer</i> | 17 | <i>De-Ice Switch</i> |
| 7 | <i>Turn & Bank Indicator</i> | 18 | <i>Cylinder Pressure</i> |
| 8 | <i>Manifold Pressure</i> | 19 | <i>Fuel Pressure Warning Light</i> |
| 9 | <i>Coolant Temperature</i> | 20 | <i>Oxygen Flow Indicator</i> |
| 10 | <i>Oil Temp & Pressure; Fuel Pressure</i> | 21 | <i>Landing Gear Indicator Lights</i> |
| 11 | Fuel Level | 22 | <i>Ammeter</i> |

(P-39N continued)

At a Glance:

Engine:

V-1710-85.

Power:

Indicated: 1,200 HP;

Take-off: 1,420 HP

Armament:

- 1 x 37mm cannon (T9);
- 2 x 12.7mm MG (.50 cal).
- 4 x 7.62mm MG (.303 cal).

Advantages:

- Excellent low altitude performance;
- Good maneuverability;
- Powerful armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Tendency to spin.

Pilot Notes:

Take-Off Speed: 160 km/h / 95 kts

Landing Speed: 155 km/h / 85 kts

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,600 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- An adequate dogfighter with good all-around performance.
- The P-39 will easily stall from rough handling, and therefore should be flown very gently especially in horizontal maneuvers.
- P-39 is an excellent gunnery platform. While the wing .50-caliber machine guns are not very effective, the nose 37mm cannon is very powerful and can bring down most targets in a few hits.
- Best performance altitude is between 1,500 and 3,000 meters. Performance begins to deteriorate above 5,000 meters

P-39Q-1



Type: Fighter

Major Users: USA; USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 12 | RPM Indicator |
| 2 | Compass | 13 | Clock |
| 3 | Compass | 14 | Oil Pressure |
| 4 | Artificial Horizon | 15 | Carburetor Air Temperature |
| 5 | Airspeed Indicator | 16 | Suction Gauge |
| 6 | Variometer | 17 | De-Ice Switch |
| 7 | Turn & Bank Indicator | 18 | Cylinder Pressure |
| 8 | Manifold Pressure | 19 | Fuel Pressure Warning Light |
| 9 | Coolant Temperature | 20 | Oxygen Flow Indicator |
| 10 | Oil Temp & Pressure; Fuel Pressure | 21 | Landing Gear Indicator Lights |
| 11 | Fuel Level | 22 | Ammeter |

(P-39Q continued)

At a Glance:

Engine:

V-1710-85.

Power:

Indicated: 1,200 HP;

Take-off: 1,420 HP

Armament:

- 1 x 37mm cannon (T9);
- 2 x 12.7mm MG (.50 cal).
- 2 x 7.62mm MG (.303 cal)

Advantages:

- Good low altitude flying characteristics;
- Improved aerodynamics;
- Good maneuverability;
- Powerful armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- While reduced, the tendency to spin remained.

Pilot Notes:

Take-Off Speed: 160 km/h / 95 kts

Landing Speed: 155 km/h / 85 kts

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,600 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- An adequate dogfighter with good all-around performance.
- The P-39 will easily stall from rough handling, and therefore should be flown very gently especially in horizontal maneuvers.
- P-39 is an excellent gunnery platform. While the wing .50-caliber machine guns are not very effective, the nose 37mm cannon is very powerful and can bring down most targets in a few hits.
- Best performance altitude is between 1,500 and 3,000 meters. Performance begins to deteriorate above 5,000 meters

P-39Q-10



Type: Fighter

Major Users: USA; USSR

Cockpit Guide:



- | | |
|--|---|
| 1 Altimeter | 12 <i>RPM Indicator</i> |
| 2 Compass | 13 <i>Clock</i> |
| 3 <i>Compass</i> | 14 <i>Oil Pressure</i> |
| 4 <i>Artificial Horizon</i> | 15 <i>Carburetor Air Temperature</i> |
| 5 Airspeed Indicator | 16 <i>Suction Gauge</i> |
| 6 <i>Variometer</i> | 17 <i>De-Ice Switch</i> |
| 7 <i>Turn & Bank Indicator</i> | 18 <i>Cylinder Pressure</i> |
| 8 <i>Manifold Pressure</i> | 19 <i>Fuel Pressure Warning Light</i> |
| 9 <i>Coolant Temperature</i> | 20 <i>Oxygen Flow Indicator</i> |
| 10 <i>Oil Temp & Pressure; Fuel Pressure</i> | 21 <i>Landing Gear Indicator Lights</i> |
| 11 Fuel Level | 22 <i>Ammeter</i> |

(P-39Q continued)

At a Glance:

Engine:

V-1710-85.

Power:

Indicated: 1,200 HP;

Take-off: 1,420 HP

Armament:

- 1 x 37mm cannon (T9).
- 2 x 12.7mm MG (.50 cal).

Advantages:

- Good overall flying characteristics;
- Improved aerodynamics;
- Good maneuverability;
- The tendency to spin at low speed was considerably reduced;
- Increased durability;
- Easy to fly.

Disadvantages:

- Reduced armament.

Pilot Notes:

Take-Off Speed: 160 km/h / 95 kts

Landing Speed: 155 km/h / 85 kts

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,600 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- An adequate dogfighter with good all-around performance.
- The P-39 will easily stall from rough handling, and therefore should be flown very gently especially in horizontal maneuvers.
- P-39 is an excellent gunnery platform. While the wing .50-caliber machine guns are not very effective, the nose 37mm cannon is very powerful and can bring down most targets in a few hits.
- Best performance altitude is between 1,500 and 3,000 meters. Performance begins to deteriorate above 5,000 meters

Hawk 81A-2



Type: Fighter

Major Users: USA

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Compass | 10 | RPM Indicator |
| 2 | Artificial Horizon | 11 | Gear & Flap Position Indicator |
| 3 | Airspeed Indicator | 12 | Suction Gauge |
| 4 | Variometer | 13 | Carburetor Air Temperature |
| 5 | Turn & Bank Indicator | 14 | Compass |
| 6 | Fuel Level | 15 | Ammeter |
| 7 | Clock | 16 | Coolant Temperature |
| 8 | Altimeter | 17 | Oil Temp & Pressure; Fuel Pressure |
| 9 | Manifold Pressure | 18 | Engine Temperature Warning Light |

(Hawk-81 continued)

At a Glance:

Engine:

1 x V-1710-33

Power: 1,150 HP

Armament:

- 2 x .50-cal machine guns
- 4 x .30-cal machine guns
- 500 lb bomb

Advantages:

- Sturdy aircraft that can endure a great deal of punishment;
- More maneuverable than any other US aircraft at the time of Pearl Harbor;
- Easy to fly.

Disadvantages:

- Largely obsolescent by any standards even before it was ordered into production;
- Too slow;
- Low climb rate;
- Easily outmaneuvered by the Zero.

Pilot Notes:

- P-40 is inferior to most contemporary enemy fighters; however in capable hands it can win a fight against almost any opponent.
- Against the Japanese, the P-40 does not fare very well. Against the early Japanese fighters superior speed, especially in a dive, can be used; however against more capable Japanese planes, the best strategy is to have a good wingman.
- P-40 is a stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target
- Best performance altitude is between 1,000 and 3,500 meters. Worst performance above 6,000 meters

P-40B



Type: Fighter

Major Users: USA

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Compass | 10 | RPM Indicator |
| 2 | Artificial Horizon | 11 | Gear & Flap Position Indicator |
| 3 | Airspeed Indicator | 12 | Suction Gauge |
| 4 | Variometer | 13 | Carburetor Air Temperature |
| 5 | Turn & Bank Indicator | 14 | Compass |
| 6 | Fuel Level | 15 | Ammeter |
| 7 | Clock | 16 | Coolant Temperature |
| 8 | Altimeter | 17 | Oil Temp & Pressure; Fuel Pressure |
| 9 | Manifold Pressure | 18 | Engine Temperature Warning Light |

(P-40 continued)

At a Glance:

Engine:

1 x V-1710-33

Power: 1,150 HP

Armament:

- 2 x .50-cal machine guns
- 4 x .30-cal machine guns

Advantages:

- Sturdy aircraft that can endure a great deal of punishment;
- More maneuverable than any other US aircraft at the time of Pearl Harbor;
- Easy to fly.

Disadvantages:

- Largely obsolescent by any standards even before it was ordered into production;
- Too slow;
- Low climb rate;
- Easily outmaneuvered by the Zero.

Pilot Notes:

- P-40 is somewhat inferior to contemporary enemy fighters, however in capable hands it can win a fight against almost any opponent.
- Against the Japanese, the P-40 does not fare very well. Against the early Japanese fighters superior speed, especially in a dive, can be used; however against more capable Japanese planes, the best strategy is to have a good wingman.
- P-40 is a stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target
- Best performance altitude is between 1,000 and 3,500 meters. Worst performance above 6,000 meters

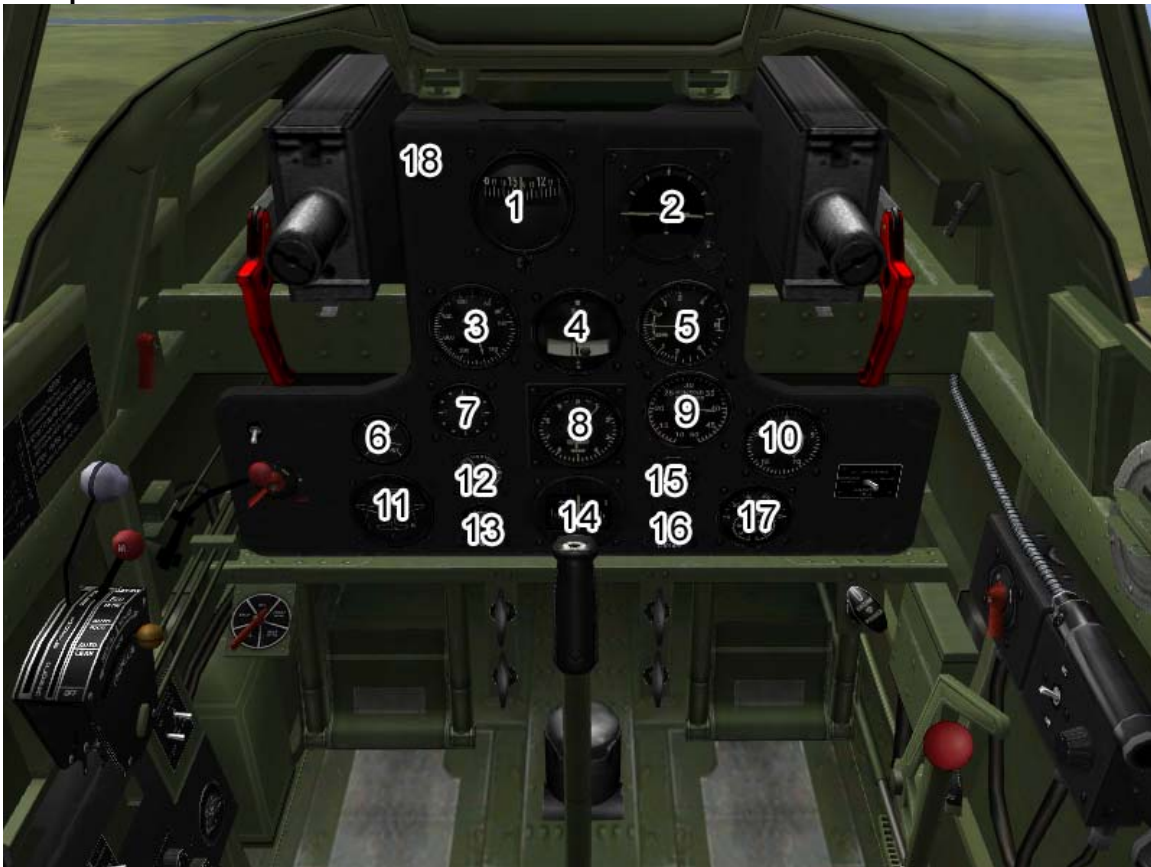
P-40C



Type: Fighter-Bomber

Major Users: USA

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Compass | 10 | RPM Indicator |
| 2 | Artificial Horizon | 11 | Gear & Flap Position Indicator |
| 3 | Airspeed Indicator | 12 | Suction Gauge |
| 4 | Variometer | 13 | Carburetor Air Temperature |
| 5 | Turn & Bank Indicator | 14 | Compass |
| 6 | Fuel Level | 15 | Ammeter |
| 7 | Clock | 16 | Coolant Temperature |
| 8 | Altimeter | 17 | Oil Temp & Pressure; Fuel Pressure |
| 9 | Manifold Pressure | 18 | Engine Temperature Warning Light |

(P-40 continued)

At a Glance:

Engine:

1 x V-1710-33

Power: 1,150 HP

Armament:

- 2 x .50-cal machine guns
- 4 x .30-cal machine guns
- 500 lb bomb

Advantages:

- Sturdy aircraft that can endure a great deal of punishment;
- More maneuverable than any other US aircraft at the time of Pearl Harbor;
- Easy to fly.

Disadvantages:

- Largely obsolescent by any standards even before it was ordered into production;
- Too slow;
- Low climb rate;
- Easily outmaneuvered by the Zero.

Pilot Notes:

- P-40 is somewhat inferior to contemporary enemy fighters, however in capable hands it can win a fight against almost any opponent.
- Against the Luftwaffe, the key to winning aerial combat with the P-40 is to get the enemy to slow down and commit to a turning fight or rolling scissors. These fights are P-40's strong point and Germans will usually lose. In vertical combat P-40 can still defeat a FW-190, but a Bf-109G and above is greatly superior to the P-40 in the vertical.
- Against the Japanese, the P-40 does not fare quite as well. Against the early Japanese fighters superior speed, especially in a dive, can be used; however against more capable Japanese planes, the best strategy is to have a good wingman.
- P-40 is a stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target
- Best performance altitude is between 1,000 and 3,500 meters. Worst performance above 6,000 meters

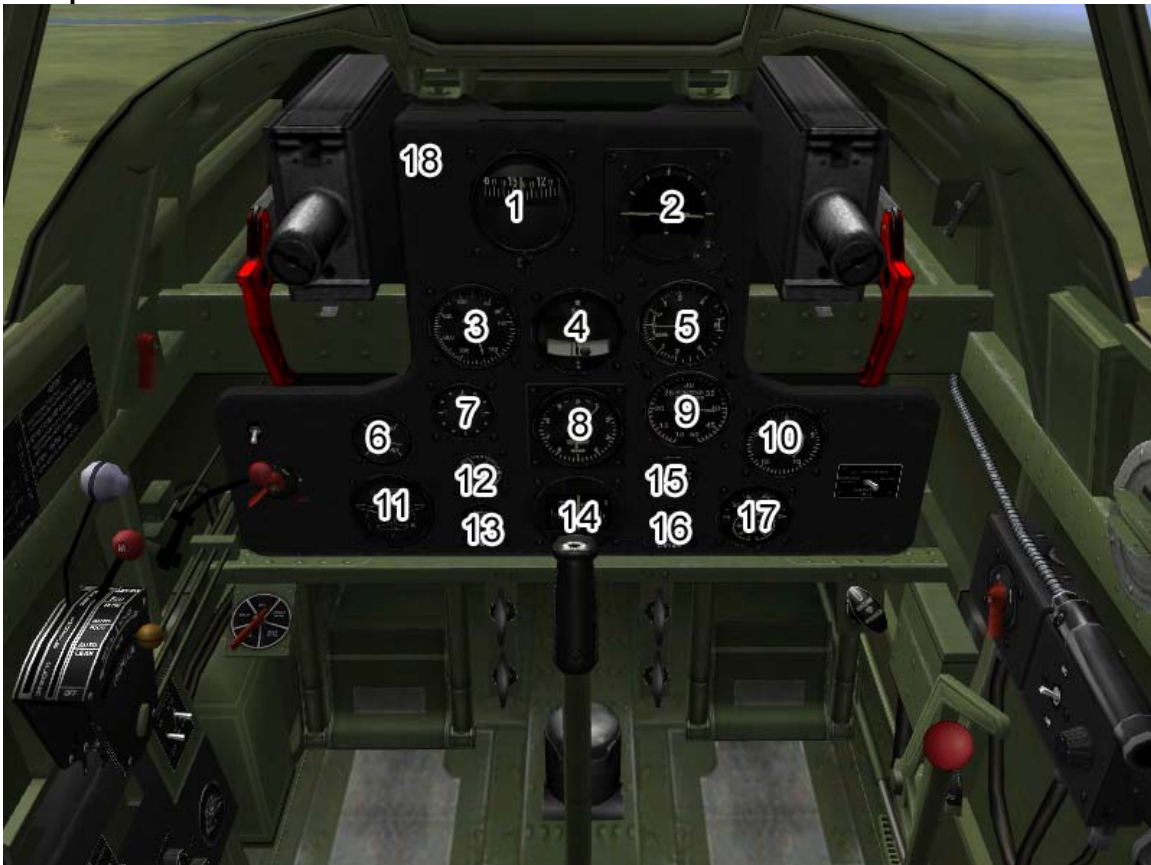
Tomahawk Mk IIa



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Compass | 10 | RPM Indicator |
| 2 | Artificial Horizon | 11 | Gear & Flap Position Indicator |
| 3 | Airspeed Indicator | 12 | Suction Gauge |
| 4 | Variometer | 13 | Carburetor Air Temperature |
| 5 | Turn & Bank Indicator | 14 | Compass |
| 6 | Fuel Level | 15 | Ammeter |
| 7 | Clock | 16 | Coolant Temperature |
| 8 | Altimeter | 17 | Oil Temp & Pressure; Fuel Pressure |
| 9 | Manifold Pressure | 18 | Engine Temperature Warning Light |

(P-40 continued)

At a Glance:

Engine:

1 x V-1710-33

Power: 1,150 HP

Armament:

- 2 x .50-cal machine guns
- 4 x .303 machine guns

Advantages:

- Sturdy aircraft that can endure a great deal of punishment;
- More maneuverable than any other US aircraft at the time of Pearl Harbor;
- Easy to fly.

Disadvantages:

- Largely obsolescent by any standards even before it was ordered into production;
- Too slow;
- Low climb rate;
- Easily outmaneuvered by the Zero.

Pilot Notes:

- British version of the P-40B.
- P-40 is somewhat inferior to contemporary fighters, however in capable hands it can win a fight against almost any opponent.
- Against the Luftwaffe, the key to winning aerial combat with the P-40 is to get the enemy to slow down and commit to a turning fight or rolling scissors. These fights are P-40's strong point and Germans will usually lose. In vertical combat P-40 can still defeat a FW-190, but a Bf-109G and above is greatly superior to the P-40 in the vertical.
- Against the Japanese, the P-40 does not fare quite as well. Against the early Japanese fighters superior speed, especially in a dive, can be used; however against more capable Japanese planes, the best strategy is to have a good wingman.
- P-40 is a stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target
- Best performance altitude is between 1,000 and 3,500 meters. Worst performance above 6,000 meters

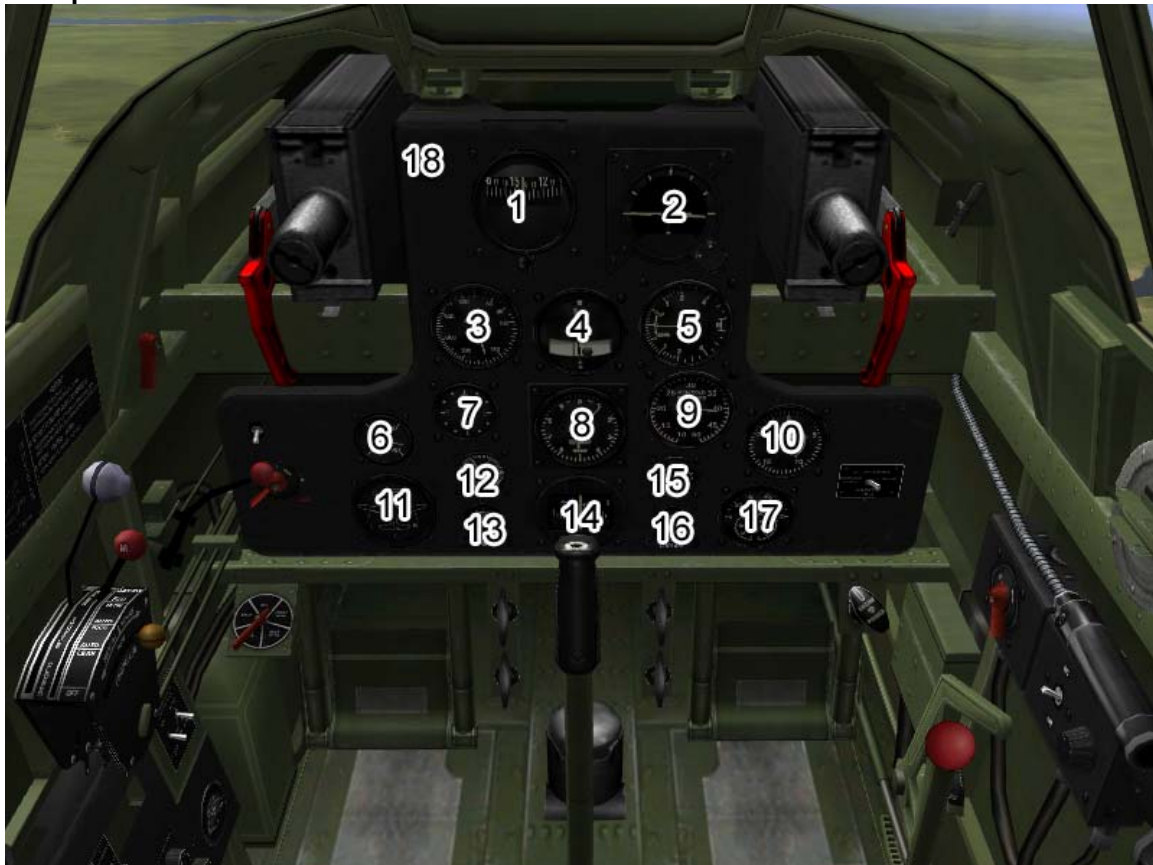
Tomahawk Mk IIb



Type: Fighter-Bomber

Major Users: RAF

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Compass | 10 | RPM Indicator |
| 2 | Artificial Horizon | 11 | Gear & Flap Position Indicator |
| 3 | Airspeed Indicator | 12 | Suction Gauge |
| 4 | Variometer | 13 | Carburetor Air Temperature |
| 5 | Turn & Bank Indicator | 14 | Compass |
| 6 | Fuel Level | 15 | Ammeter |
| 7 | Clock | 16 | Coolant Temperature |
| 8 | Altimeter | 17 | Oil Temp & Pressure; Fuel Pressure |
| 9 | Manifold Pressure | 18 | Engine Temperature Warning Light |

(P-40 continued)

At a Glance:

Engine:

1 x V-1710-33

Power: 1,150 HP

Armament:

- 2 x .50-cal machine guns
- 4 x .303 machine guns
- 500 lb bomb

Advantages:

- Sturdy aircraft that can endure a great deal of punishment;
- More maneuverable than any other US aircraft at the time of Pearl Harbor;
- Easy to fly.

Disadvantages:

- Largely obsolescent by any standards even before it was ordered into production;
- Too slow;
- Low climb rate;
- Easily outmaneuvered by the Zero.

Pilot Notes:

- British version of the P-40C.
- P-40 is somewhat inferior to contemporary fighters; however in capable hands it can win a fight against almost any opponent.
- Against the Luftwaffe, the key to winning aerial combat with the P-40 is to get the enemy to slow down and commit to a turning fight or rolling scissors. These fights are P-40's strong point and Germans will usually lose. In vertical combat P-40 can still defeat a FW-190, but a Bf-109G and above is greatly superior to the P-40 in the vertical.
- Against the Japanese, the P-40 does not fare quite as well. Against the early Japanese fighters superior speed, especially in a dive, can be used; however against more capable Japanese planes, the best strategy is to have a good wingman.
- P-40 is a stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target
- Best performance altitude is between 1,000 and 3,500 meters. Worst performance above 6,000 meters

P-40E



Type: Fighter

Major Users: USA; USSR

Cockpit Guide:



- | | | | |
|---|----------------------------|----|------------------------------------|
| 1 | Compass | 10 | Gear & Flap Position Indicator |
| 2 | Artificial Horizon | 11 | Clock |
| 3 | Turn & Bank Indicator | 12 | RPM Indicator |
| 4 | Airspeed Indicator | 13 | Compass |
| 5 | Altimeter | 14 | Oil Pressure |
| 6 | Variometer | 15 | Oil Temp & Pressure; Fuel Pressure |
| 7 | Manifold Pressure | 16 | Landing Gear Warning Light |
| 8 | Carburetor Air Temperature | 17 | Fuel Level Warning Light |
| 9 | Coolant Temperature | | |

(P-40 continued)

At a Glance:

Engine:

V-1710-39

Power: 1,150 HP

Armament:

- 6 x 12.7 mm MG
- 1 x 227 kg (500 lb) bomb
- 2 x 45 kg bombs

Advantages:

- Increased firepower over earlier P-40s;
- Sturdy aircraft that can endure a great deal of punishment.

Disadvantages:

- Slow;
- Lacks maneuverability;
- Low climb rate;
- Largely obsolescent by any standards before it even entered production.

Pilot Notes:

Take-Off Speed: 160 km/h / 95 kts

Landing Speed: 155 km/h / 85 kts

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,600 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- P-40 is somewhat inferior to contemporary enemy fighters, however in capable hands it can win a fight against almost any opponent.
- Against the Luftwaffe, the key to winning aerial combat with the P-40 is to get the enemy to slow down and commit to a turning fight or rolling scissors. These fights are P-40's strong point and Germans will usually lose. In vertical combat P-40 can still defeat a FW-190, but a Bf-109G and above is greatly superior to the P-40 in the vertical.
- Against the Japanese, the P-40 does not fare quite as well. Against the early Japanese fighters superior speed, especially in a dive, can be used; however against more capable Japanese planes, the best strategy is to have a good wingman.
- P-40 is a stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target
- Best performance altitude is between 1,000 and 3,500 meters. Worst performance above 6,000 meters

P-40E M-105 field mod



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|----------------------------|----|------------------------------------|
| 1 | Compass | 10 | Gear & Flap Position Indicator |
| 2 | Artificial Horizon | 11 | Clock |
| 3 | Turn & Bank Indicator | 12 | RPM Indicator |
| 4 | Airspeed Indicator | 13 | Compass |
| 5 | Altimeter | 14 | Oil Pressure |
| 6 | Variometer | 15 | Oil Temp & Pressure; Fuel Pressure |
| 7 | Manifold Pressure | 16 | Landing Gear Warning Light |
| 8 | Carburetor Air Temperature | 17 | Fuel Level Warning Light |
| 9 | Coolant Temperature | | |

(P-40 continued)

At a Glance:

Engine:

Klimov M-105P

Power: 1,100 HP

Armament:

- 6 x 12.7 mm MG
- Up to 6 x RS-82 Rockets
- 1 x 250 kg bomb
- 2 x 50 kg bombs

Advantages:

- Increased firepower over earlier P-40s;
- Sturdy aircraft that can endure a great deal of punishment.

Disadvantages:

- Slow;
- Lacks maneuverability;
- Low climb rate;
- Largely obsolescent by any standards before it even entered production.

Pilot Notes:

Take-Off Speed: 160 km/h / 95 kts

Landing Speed: 155 km/h / 85 kts

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,600 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- P-40 is somewhat inferior to contemporary enemy fighters, however in capable hands it can win a fight against almost any opponent.
- Against the Luftwaffe, the key to winning aerial combat with the P-40 is to get the enemy to slow down and commit to a turning fight or rolling scissors. These fights are P-40's strong point and Germans will usually lose. In vertical combat P-40 can still defeat a FW-190, but a Bf-109G and above is greatly superior to the P-40 in the vertical.
- Against the Japanese, the P-40 does not fare quite as well. Against the early Japanese fighters superior speed, especially in a dive, can be used; however against more capable Japanese planes, the best strategy is to have a good wingman.
- P-40 is a stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target
- Best performance altitude is between 1,000 and 3,500 meters. Worst performance above 6,000 meters

P-40M



Type: Fighter

Major Users: USA; USSR

Cockpit Guide:



- | | | | |
|---|----------------------------|----|------------------------------------|
| 1 | Compass | 10 | Gear & Flap Position Indicator |
| 2 | Artificial Horizon | 11 | Clock |
| 3 | Turn & Bank Indicator | 12 | RPM Indicator |
| 4 | Airspeed Indicator | 13 | Compass |
| 5 | Altimeter | 14 | Oil Pressure |
| 6 | Variometer | 15 | Oil Temp & Pressure; Fuel Pressure |
| 7 | Manifold Pressure | 16 | Landing Gear Warning Light |
| 8 | Carburetor Air Temperature | 17 | Fuel Level Warning Light |
| 9 | Coolant Temperature | | |

(P-40 continued)

At a Glance:

Engine:

V-1710-81

Armament:

- 6 x 12,7mm MG

Power:

At 17,300 ft: 1,125 HP

Take-off: 1,200 HP

Advantages:

- Increased performance over earlier P-40s;
- Good durability.

Disadvantages:

- Weak armament;
- Poor roll performance.

Pilot Notes:

Take-Off Speed: 160 km/h / 95 kts

Landing Speed: 155 km/h / 85 kts

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,600 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: No

- P-40 is somewhat inferior to contemporary enemy fighters, however in capable hands it can win a fight against almost any opponent.
- Against the Luftwaffe, the key to winning aerial combat with the P-40 is to get the enemy to slow down and commit to a turning fight or rolling scissors. These fights are P-40's strong point and Germans will usually lose. In vertical combat P-40 can still defeat a FW-190, but a Bf-109G and above is greatly superior to the P-40 in the vertical.
- Against the Japanese, the P-40 does not fare quite as well. Against the early Japanese fighters superior speed, especially in a dive, can be used; however against more capable Japanese planes, the best strategy is to have a good wingman.
- P-40 is a stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target
- Best performance altitude is between 1,000 and 3,500 meters. Worst performance above 6,000 meters

P-47D-10



Type: Fighter

Major Users: USA

Cockpit Guide:



- | | | | |
|----|---|----|--------------------------------------|
| 1 | <i>Clock</i> | 13 | <i>Accelerometer</i> |
| 2 | <i>Compass</i> | 14 | <i>Engine Temperature</i> |
| 3 | <i>Artificial Horizon</i> | 15 | <i>Water Pressure</i> |
| 4 | <i>Turbo RPM Indicator</i> | 16 | <i>Compass</i> |
| 5 | <i>Ammeter</i> | 17 | <i>Manifold Pressure</i> |
| 6 | <i>Fuel Level</i> | 18 | <i>RPM Indicator</i> |
| 7 | <i>Suction Gauge</i> | 19 | <i>Oil Temperature</i> |
| 8 | <i>Airspeed Indicator</i> | 20 | <i>F.A.S. Pressure</i> |
| 9 | <i>Turn & Bank Indicator</i> | 21 | <i>Oxygen Flow Indicator</i> |
| 10 | <i>Variometer</i> | 22 | <i>Oxygen Pressure</i> |
| 11 | <i>Altimeter</i> | 23 | <i>Landing Gear Indicator Lights</i> |
| 12 | <i>Oil Temp & Pressure; Fuel Pressure</i> | 24 | <i>Fuel Level Warning Light</i> |

(P-47 continued)

At a Glance:

Engine:

R-2800-59

Power: 2,300 HP

Armament:

- 8 x .50 Cal (12.7 mm) MG

Advantages:

- Powerful, rugged, reliable R-2800 Engine;
- Great high altitude performance;
- Outstanding range;
- Fast dive speed;
- Tremendous firepower.

Disadvantages:

- Poor turn performance, particularly at lower altitudes;
- Sub-par climb rate.

Pilot Notes:

Take-Off Speed: 175 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,550 RPM

Economy Cruise: 2,400 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: Yes, 5 minute maximum

Supercharger: Two-Speed

- P-47 is best used as an energy fighter against most fighters with the possible exception of the Me-262. It is second to none in power dives and will lose any opponent in a dive with enough altitude. When starting a high-speed dive with a 109 at same altitude and airspeed, a P-47 can actually outclimb most 109s in a subsequent zoom climb and end up at higher altitudes.
- Primary means of attacking ground targets is in 15-45 degree dives.
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns are ineffective against tanks but very effective against softer ground targets.
- P-47 is a very stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target.
- Supercharger speeds need to be switched at 4,500 meters.
- Best performance altitude is between 3,500 and 4,800 meters for speed 1 and 6,500 and 7,500 for speed 2.
- Worst performance between 0 and 2,000 meters

P-47D-22



Type: Fighter-Bomber

Major Users: USA

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|-------------------------------|
| 1 | Clock | 13 | Accelerometer |
| 2 | Compass | 14 | Engine Temperature |
| 3 | Artificial Horizon | 15 | Water Pressure |
| 4 | Turbo RPM Indicator | 16 | Compass |
| 5 | Ammeter | 17 | Manifold Pressure |
| 6 | Fuel Level | 18 | RPM Indicator |
| 7 | Suction Gauge | 19 | Oil Temperature |
| 8 | Airspeed Indicator | 20 | F.A.S. Pressure |
| 9 | Turn & Bank Indicator | 21 | Oxygen Flow Indicator |
| 10 | Variometer | 22 | Oxygen Pressure |
| 11 | Altimeter | 23 | Landing Gear Indicator Lights |
| 12 | Oil Temp & Pressure; Fuel Pressure | 24 | Fuel Level Warning Light |

(P-47 continued)

At a Glance:

Engine:

R-2800-59

Power: 2,300 HP

Armament:

- 8 x .50 Cal (12.7 mm) MG

Advantages:

- Powerful, rugged, reliable R-2800 Engine;
- Great high altitude performance;
- Outstanding range;
- Fast dive speed;
- Tremendous firepower.

Disadvantages:

- Poor turn performance, particularly at lower altitudes;
- Sub-par climb rate.

Pilot Notes:

Take-Off Speed: 175 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,550 RPM

Economy Cruise: 2,400 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: Yes, 5 minute maximum

Supercharger: Two-Speed

- P-47 is best used as an energy fighter against most fighters with the possible exception of the Me-262. It is second to none in power dives and will lose any opponent in a dive with enough altitude. When starting a high-speed dive with a 109 at same altitude and airspeed, a P-47 can actually outclimb most 109s in a subsequent zoom climb and end up at higher altitudes.
- Primary means of attacking ground targets is in 15-45 degree dives.
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns are ineffective against tanks but very effective against softer ground targets.
- P-47 is a very stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target.
- Supercharger speeds need to be switched at 4,500 meters.
- Best performance altitude is between 3,500 and 4,800 meters for speed 1 and 6,500 and 7,500 for speed 2.
- Worst performance between 0 and 2,000 meters

P-47D-27



Type: Fighter-Bomber

Major Users: USA

Cockpit Guide:



- | | | | |
|----|---------------------------|----|------------------------------------|
| 1 | Clock | 13 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 14 | Turbo RPM Indicator |
| 3 | Artificial Horizon | 15 | Accelerometer |
| 4 | Engine Temperature | 16 | Suction Gauge |
| 5 | Airspeed Indicator | 17 | Water Pressure |
| 6 | Ammeter | 18 | Fuel Level |
| 7 | Altimeter | 19 | Oil Temperature |
| 8 | Turn & Bank Indicator | 20 | F.A.S. Pressure |
| 9 | Variometer | 21 | Oxygen Flow Indicator |
| 10 | Compass | 22 | Oxygen Pressure |
| 11 | Manifold Pressure | 23 | Landing Gear Indicator Lights |
| 12 | RPM Indicator | 24 | Fuel Level Warning Light |

(P-47 continued)

At a Glance:

Engine:

R-2800-59

Power: 2,300 HP

Armament:

- 8 x 12.7 mm MG

Advantages:

- Powerful, rugged, reliable R-2800 Engine;
- Great high altitude performance;
- Outstanding range;
- Fast dive speed;
- Tremendous firepower.

Disadvantages:

- Poor turn performance, particularly at lower altitudes;
- Sub-par climb rate.

Pilot Notes:

Take-Off Speed: 175 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,550 RPM

Economy Cruise: 2,400 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: Yes, 5 minute maximum

Supercharger: Two-Speed

- P-47 is best used as an energy fighter against most fighters with the possible exception of the Me-262. It is second to none in power dives and will lose any opponent in a dive with enough altitude. When starting a high-speed dive with a 109 at same altitude and airspeed, a P-47 can actually outclimb most 109s in a subsequent zoom climb and end up at higher altitudes.
- Primary means of attacking ground targets is in 15-45 degree dives.
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns are ineffective against tanks but very effective against softer ground targets.
- P-47 is a very stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target.
- Supercharger speeds need to be switched at 4,500 meters.
- Best performance altitude is between 3,500 and 4,800 meters for speed 1 and 6,500 and 7,500 for speed 2.
- Worst performance between 0 and 2,000 meters

P-47D



Type: Fighter-Bomber

Major Users: USA

Cockpit Guide:



- | | | | |
|----|---------------------------|----|------------------------------------|
| 1 | Clock | 13 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 14 | Turbo RPM Indicator |
| 3 | Artificial Horizon | 15 | Accelerometer |
| 4 | Engine Temperature | 16 | Suction Gauge |
| 5 | Airspeed Indicator | 17 | Water Pressure |
| 6 | Ammeter | 18 | Fuel Level |
| 7 | Altimeter | 19 | Oil Temperature |
| 8 | Turn & Bank Indicator | 20 | F.A.S. Pressure |
| 9 | Variometer | 21 | Oxygen Flow Indicator |
| 10 | Compass | 22 | Oxygen Pressure |
| 11 | Manifold Pressure | 23 | Landing Gear Indicator Lights |
| 12 | RPM Indicator | 24 | Fuel Level Warning Light |

(P-47 continued)

At a Glance:

Engine:

R-2800-59

Power: 2,300 HP

Armament:

- 8 x 12.7 mm MG

Advantages:

- Powerful, rugged, reliable R-2800 Engine;
- Great high altitude performance;
- Outstanding range;
- Fast dive speed;
- Tremendous firepower.

Disadvantages:

- Poor turn performance, particularly at lower altitudes;
- Sub-par climb rate.

Pilot Notes:

Take-Off Speed: 175 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,550 RPM

Economy Cruise: 2,400 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: Yes, 5 minute maximum

Supercharger: Two-Speed

- This is the late 150 octane version and increased boost pressure. Its performance almost approaches the P-47M.
- P-47 is best used as an energy fighter against most fighters with the possible exception of the Me-262. It is second to none in power dives and will lose any opponent in a dive with enough altitude. When starting a high-speed dive with a 109 at same altitude and airspeed, a P-47 can actually outclimb most 109s in a subsequent zoom climb and end up at higher altitudes.
- Primary means of attacking ground targets is in 15-45 degree dives.
- Rockets should be fired from 200 meters or less. Bombs should be dropped from 100 meters or above without delay, or from any altitude with 3+ second delay.
- Machine guns are ineffective against tanks but very effective against softer ground targets.
- P-47 is a very stable gunnery platform. The wing machine guns are best used at the convergence range, and usually take a 2-3 second burst to bring down a target.
- Supercharger speeds need to be switched at 4,500 meters.
- Best performance altitude is between 3,500 and 4,800 meters for speed 1 and 6,500 and 7,500 for speed 2.
- Worst performance between 0 and 2,000 meters

P-51B-NA



Type: Fighter

Major Users: USA

Cockpit Guide:



- | | |
|--|--|
| 1 Compass | 11 <i>Turn & Bank Indicator</i> |
| 2 <i>Clock</i> | 12 <i>Variometer</i> |
| 3 <i>Suction Gauge</i> | 13 <i>Coolant Temperature</i> |
| 4 <i>Manifold Pressure</i> | 14 <i>Oil Temp & Pressure; Fuel Pressure</i> |
| 5 Altimeter | 15 <i>Engine Primer</i> |
| 6 <i>Compass</i> | 16 <i>Oxygen Cylinder Pressure</i> |
| 7 <i>Artificial Horizon</i> | 17 Fuel Level (Left) |
| 8 <i>RPM Indicator</i> | 18 Fuel Level (Right) |
| 9 <i>Landing Gear Indicator Lights</i> | 19 <i>Oil Pressure</i> |
| 10 Airspeed Indicator | 20 Fuel Level (Fuselage) – not shown |

(P-51 continued)

At a Glance:

Engine:

1 x V-1650-3

Power:

Take-off: 1,400 HP

Indicated: 1,450 HP At 6040 m

Armament:

- 4 x .50 caliber machine guns

Advantages:

- Great range for a fighter;
- High top speed.

Disadvantages:

- Mediocre maneuverability;
- Poor rearwards visibility.

Pilot Notes:

- The Mustang is best used at high altitudes. Below 20,000 feet its superiority over the enemy deteriorates and finally completely disappears as it approaches the ground.
- The P-51 should not be used as a turn-and-burn fighter. The key to victory is having advantage in both the airspeed and altitude.

P-51C-NT



Type: Fighter

Major Users: USA

Cockpit Guide:



- | | | | |
|----|-------------------------------|----|--|
| 1 | Compass | 11 | Turn & Bank Indicator |
| 2 | Clock | 12 | Variometer |
| 3 | Suction Gauge | 13 | Coolant Temperature |
| 4 | Manifold Pressure | 14 | Oil Temp & Pressure; Fuel Pressure |
| 5 | Altimeter | 15 | Engine Primer |
| 6 | Compass | 16 | Oxygen Cylinder Pressure |
| 7 | Artificial Horizon | 17 | Fuel Level (Left) |
| 8 | RPM Indicator | 18 | Fuel Level (Right) |
| 9 | Landing Gear Indicator Lights | 19 | Oil Pressure |
| 10 | Airspeed Indicator | 20 | Fuel Level (Fuselage) – not shown |

(P-51 continued)

At a Glance:

Engine:

1 x V-1650-7

Power:

Take-off: 1,450 HP

Indicated: 1,695 HP At 3,140 m

Armament:

- 4 x .50 cal machine guns

Advantages:

- Great range for a fighter;
- High top speed.

Disadvantages:

- Mediocre maneuverability;
- Poor rearwards visibility.

Pilot Notes:

- The Mustang is best used at high altitudes. Below 20,000 feet its superiority over the enemy deteriorates and finally completely disappears as it approaches the ground.
- The P-51 should not be used as a turn-and-burn fighter. The key to victory is having advantage in both the airspeed and altitude.

P-51D-5NT



Type: Fighter

Major Users: USA

Cockpit Guide:



- | | | | |
|----|----------------------------|----|--|
| 1 | Compass | 13 | Variometer |
| 2 | Clock | 14 | Oil Temp & Pressure; Fuel Pressure |
| 3 | Suction Gauge | 15 | Oxygen Flow Indicator |
| 4 | Manifold Pressure | 16 | Oxygen Pressure |
| 5 | Airspeed Indicator | 17 | Fuel Level (Left) |
| 6 | Compass | 18 | Fuel Level (Right) |
| 7 | Artificial Horizon | 19 | Landing Gear Indicator Lights |
| 8 | Coolant Temperature | 20 | Supercharger Warning Light |
| 9 | Carburetor Air Temperature | 21 | Oil Pressure |
| 10 | RPM Indicator | 22 | Fuel Level (Fuselage) – not shown |
| 11 | Altimeter | 23 | Slip Ball |
| 12 | Turn & Bank Indicator | | |

(P-51 continued)

At a Glance:

Engine:

V-1650-7

Power:

Take off: 1,490 HP

WEP: 1,720 HP

Armament:

- 6 x 12.7 mm MG

Advantages:

- Excellent long-range, high speed, high altitude performance;
- Outstanding in the long-range bomber escort role.

Disadvantages:

- Low-altitude performance not as impressive.
- Can be destroyed by damage that would not affect other aircraft seriously;
- Liquid-cooled engine that could be disabled by a single shot.

Pilot Notes:

- The Mustang is best used at high altitudes. Below 20,000 feet its superiority over the enemy deteriorates and finally completely disappears as it approaches the ground.
- The P-51 should not be used as a turn-and-burn fighter. The key to victory is having advantage in both the airspeed and altitude.

P-51D-20NA



Type: Fighter

Major Users: USA

Cockpit Guide:



- | | | | |
|----|-----------------------------------|----|---|
| 1 | Compass | 12 | <i>Turn & Bank Indicator</i> |
| 2 | <i>Clock</i> | 13 | <i>Variometer</i> |
| 3 | <i>Suction Gauge</i> | 14 | <i>Oil Temp & Pressure; Fuel Pressure</i> |
| 4 | <i>Manifold Pressure</i> | 15 | <i>Oxygen Flow Indicator</i> |
| 5 | Airspeed Indicator | 16 | <i>Oxygen Pressure</i> |
| 6 | <i>Compass</i> | 17 | Fuel Level (Left) |
| 7 | <i>Artificial Horizon</i> | 18 | Fuel Level (Right) |
| 8 | <i>Coolant Temperature</i> | 19 | <i>Landing Gear Indicator Lights</i> |
| 9 | <i>Carburetor Air Temperature</i> | 20 | <i>Supercharger Warning Light</i> |
| 10 | <i>RPM Indicator</i> | 21 | <i>Oil Pressure</i> |
| 11 | Altimeter | 22 | Fuel Level (Fuselage) – not shown |

(P-51 continued)

At a Glance:

Engine:

V-1650-7

Power:

Take off: 1,490 HP

WEP: 1,720 HP

Armament:

- 6 x 12.7 mm MG

Advantages:

- Excellent long-range, high speed, high altitude performance;
- Outstanding in the long-range bomber escort role.

Disadvantages:

- Low-altitude performance not as impressive;
- Can be destroyed by damage that would not affect other aircraft seriously;
- Liquid-cooled engine that could be disabled by a single shot.

Pilot Notes:

- The Mustang is best used at high altitudes. Below 20,000 feet its superiority over the enemy deteriorates and finally completely disappears as it approaches the ground.
- The P-51 should not be used as a turn-and-burn fighter. The key to victory is having advantage in both the airspeed and altitude.
- To use the K-14 gunsight, use the 'Toggle Sight Mode (Auto)' button to switch gunsight mode. Use the 'Adjust Sight Control to Right' and 'Adjust Sight Control to Left' buttons to select the target aircraft type. Use the 'Increase Sight Distance' and 'Decrease Sight Distance' buttons to adjust the sight circle for the target aircraft to fit in it. Track the target aircraft for at least 2 seconds to maintain correct lead.

Mustang Mk III



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | |
|--|--|
| 1 Compass | 11 <i>Turn & Bank Indicator</i> |
| 2 <i>Clock</i> | 12 <i>Variometer</i> |
| 3 <i>Suction Gauge</i> | 13 <i>Coolant Temperature</i> |
| 4 <i>Manifold Pressure</i> | 14 <i>Oil Temp & Pressure; Fuel Pressure</i> |
| 5 Altimeter | 15 <i>Engine Primer</i> |
| 6 <i>Compass</i> | 16 <i>Oxygen Cylinder Pressure</i> |
| 7 <i>Artificial Horizon</i> | 17 Fuel Level (Left) |
| 8 <i>RPM Indicator</i> | 18 Fuel Level (Right) |
| 9 <i>Landing Gear Indicator Lights</i> | 19 <i>Oil Pressure</i> |
| 10 Airspeed Indicator | 20 Fuel Level (Fuselage) – not shown |

(P-51 continued)

At a Glance:

Engine:

1 x V-1650-7

Power:

Take-off: 1,450 HP

Indicated: 1,695 HP At 3,140 m

Armament:

- 4 x .50 cal machine guns

Advantages:

- Great range for a fighter;
- High top speed.

Disadvantages:

- Mediocre maneuverability.

Pilot Notes:

- The Mustang is best used at high altitudes. Below 20,000 feet its superiority over the enemy deteriorates and finally completely disappears as it approaches the ground.
- The P-51 should not be used as a turn-and-burn fighter. The key to victory is having advantage in both the airspeed and altitude.

P-63C-5



Type: Fighter

Major Users: USA; USSR

Cockpit Guide:



- | | | | |
|----|---|----|--------------------------------------|
| 1 | <i>Slip Ball</i> | 12 | Fuel Level |
| 2 | Altimeter | 13 | <i>Clock</i> |
| 3 | Compass | 14 | <i>Oil Pressure</i> |
| 4 | <i>Compass</i> | 15 | <i>Coolant Temperature</i> |
| 5 | <i>Artificial Horizon</i> | 16 | <i>Suction Gauge</i> |
| 6 | Airspeed Indicator | 17 | <i>De-Ice Switch</i> |
| 7 | <i>Variometer</i> | 18 | <i>Oxygen Flow Indicator</i> |
| 8 | <i>Turn & Bank Indicator</i> | 19 | <i>Cylinder Pressure</i> |
| 9 | <i>Manifold Pressure</i> | 20 | <i>Carburetor Air Temperature</i> |
| 10 | <i>RPM Indicator</i> | 21 | <i>Oil Pressure</i> |
| 11 | <i>Oil Temp & Pressure; Fuel Pressure</i> | 22 | <i>Landing Gear Indicator Lights</i> |

(P-63 continued)

At a Glance:

Engine:

1 x V-1710-117

Power:

Sea level: 1,500 HP in WEP mode

With water injection: 1,800 HP.

Armament:

- 1 x 37-mm M10 cannon
- 4 x 12,7-mm MG 53-2 MG

Advantages:

- High top speed;
- Powerful armament;
- Good maneuverability.

Disadvantages:

- Slower climb rate than many contemporary planes;
- Still somewhat spin and stall-prone;
- Lower fuel capacity than the P-39.

Pilot Notes:

- Adequate dogfighter with good all-around performance at lower altitudes.
- The P-63 will easily stall from rough handling, and therefore should be flown very gently especially in horizontal maneuvers.
- Avoid turning dogfights with the Japanese planes at all costs.
- The climb rate is rather poor, so chasing a climbing plane is almost always futile.
- P-63 is a very stable gunnery platform. While the wing .50-caliber machine guns are not very effective, the nose 37mm cannon is quite powerful and can bring down most targets in a few hits.
- Best performance altitude is between 1,500 and 3,000 meters. Performance begins to deteriorate above 5,000 meters

Pe-2 1 series



Type: Dive / Level Bomber

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|-------------------------------------|----|--|
| 1 | <i>Pilot's Direction Indicator</i> | 18 | <i>Fuel Pressure (Engine #2)</i> |
| 2 | <i>Flaps Indicator Light</i> | 19 | <i>Oil Pressure (Engine #1)</i> |
| 3 | <i>Flaps Position Indicator</i> | 20 | <i>Oil Pressure (Engine #2)</i> |
| 4 | <i>Compass</i> | 21 | <i>Oil Temperature (Engine #1)</i> |
| 5 | Airspeed Indicator | 22 | <i>Oil Temperature (Engine #2)</i> |
| 6 | <i>Artificial Horizon</i> | 23 | <i>Coolant Temperature (Engine #1)</i> |
| 7 | <i>Variometer</i> | 24 | <i>Coolant Temperature (Engine #2)</i> |
| 8 | <i>Turn & Bank Indicator</i> | 25 | <i>Navigation Airspeed</i> |
| 9 | Altimeter | 26 | <i>Navigation Altitude</i> |
| 10 | Fuel Level | 27 | <i>Free Air Temperature</i> |
| 11 | <i>Fuel Tank Selector Switch</i> | 28 | Compass |
| 12 | <i>Manifold Pressure(Engine #1)</i> | 29 | <i>Hydraulic Pressure</i> |
| 13 | <i>Manifold Pressure(Engine #2)</i> | 30 | <i>Air Pressure</i> |
| 14 | <i>RPM Indicator (Engine #1)</i> | 31 | <i>Elevator Trim Light</i> |
| 15 | <i>RPM Indicator (Engine #2)</i> | 32 | <i>Landing Gear Indicator Lights</i> |
| 16 | <i>Inertia Gas Indicator</i> | 33 | <i>G-Load Warning Light</i> |
| 17 | <i>Fuel Pressure (Engine #1)</i> | 34 | <i>External Ordnance Status Lights</i> |

(Pe-2 continued)

Other Playable Crew Positions:



Level Bombsight



Rear Gunner

At a Glance:

Engine:

2 x M-105R.

Power: 2 x 1,100 HP

Armament:

- 2 x 7.62mm (ShKAS);
- 2 x 12.7mm (BK);
- Up to 1,000 kg of bombs.

Advantages:

- Excellent flight performance;
- High speed and range;
- Fully electric controls;
- Easy to fly.

Disadvantages:

- Weak on-board armament;
- Some unreliable electric devices.

Pilot Notes:

- Supercharger speeds need to be switched at 3,100 meters.
- Mixture adjustment is as follows: 100% at 3,200 m; 80% at 4,600 m; 60% at 6,300 m; and 40% at 8,400 m.
- While ostensibly a dive bomber, the Pe-2 is excellent in almost every ground attack mode. It can dive-bomb, level bomb, and strafe.
- The biggest weakness of the Pe-2 is its vulnerability to enemy fire. It can't take punishment nearly as well as its famous counterpart, the Il-2. Therefore, it should only be used as a dive bomber, or as a low-level attack aircraft, when enemy opposition is expected to be low.
- For well defended areas, the Pe-2 is best used as a medium-altitude level bomber.
- Do not forget to lock the tailwheel (use the Lock Tailwheel key) prior to starting a take-off run, in order to stay straight. Attempting to take off with the tailwheel unlocked will lead to your aircraft veering uncontrollably to the side.

(Pe-2 continued)

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Once the target passes under the crosshairs, the bombardier must drop the bombs manually.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to point the bombsight towards the projected impact point. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. The *bead* symbol along the outer ring of numbers shows the combined Altitude / Airspeed input. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle. As the sight angle changes, note the *ring* symbol moving along the outer ring of symbols.
- Align the *ring* with the *bead*. With them aligned, the bomb sight is pointing at the projected impact point for the currently entered altitude / airspeed parameters.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course.
- Once you see your target pass through the sight center bubble, press the Weapon 4 button to drop your bombs.

Pe-2 84 series



Type: Dive / Level Bomber

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------|----|---------------------------------|
| 1 | Pilot's Direction Indicator | 18 | Fuel Pressure (Engine #2) |
| 2 | Flaps Indicator Light | 19 | Oil Pressure (Engine #1) |
| 3 | Flaps Position Indicator | 20 | Oil Pressure (Engine #2) |
| 4 | Compass | 21 | Oil Temperature (Engine #1) |
| 5 | Airspeed Indicator | 22 | Oil Temperature (Engine #2) |
| 6 | Artificial Horizon | 23 | Coolant Temperature (Engine #1) |
| 7 | Variometer | 24 | Coolant Temperature (Engine #2) |
| 8 | Turn & Bank Indicator | 25 | Navigation Airspeed |
| 9 | Altimeter | 26 | Navigation Altitude |
| 10 | Fuel Level | 27 | Compass |
| 11 | Fuel Tank Selector Switch | 28 | Oxygen Apparatus |
| 12 | Manifold Pressure(Engine #1) | 29 | Hydraulic Pressure |
| 13 | Manifold Pressure(Engine #2) | 30 | Air Pressure |
| 14 | RPM Indicator (Engine #1) | 31 | Elevator Trim Light |
| 15 | RPM Indicator (Engine #2) | 32 | Landing Gear Indicator Lights |
| 16 | Inertia Gas Indicator | 33 | G-Load Warning Light |
| 17 | Fuel Pressure (Engine #1) | 34 | External Ordnance Status Lights |

(Pe-2 continued)

Other Playable Crew Positions:



Level Bombsight



Rear Gunner

At a Glance:

Engine:

2 x M-105RA.

Power: 1,100 HP

Armament:

- 1 x 7.62mm MG (ShKAS);
- 2 x 12.7mm MG (BK);
- 1 x 12.7mm MG (BT);
- Up to 1,000 kg of bombs.

Advantages:

- Excellent firepower;
- Improved crew protection.

Disadvantages:

- Diminished vision in lower front hemisphere;
- Increased weight;
- Lower maximum speed.

Pilot Notes:

- Supercharger speeds need to be switched at 3,100 meters.
- Mixture adjustment is as follows: 100% at 3,200 m; 80% at 4,600 m; 60% at 6,300 m; and 40% at 8,400 m.
- While ostensibly a dive bomber, the Pe-2 is excellent in almost every ground attack mode. It can dive-bomb, level bomb, and strafe.
- The biggest weakness of the Pe-2 is its vulnerability to enemy fire. It can't take punishment nearly as well as its famous counterpart, the Il-2. Therefore, it should only be used as a dive bomber, or as a low-level attack aircraft, when enemy opposition is expected to be low.
- For well defended areas, the Pe-2 is best used as a medium-altitude level bomber.

(Pe-2 continued)

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Once the target passes under the crosshairs, the bombardier must drop the bombs manually.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to point the bombsight towards the projected impact point. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. The *bead* symbol along the outer ring of numbers shows the combined Altitude / Airspeed input. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle. As the sight angle changes, note the *ring* symbol moving along the outer ring of symbols.
- Align the *ring* with the *bead*. With them aligned, the bomb sight is pointing at the projected impact point for the currently entered altitude / airspeed parameters.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course.
- Once you see your target pass through the sight center bubble, press the Weapon 4 button to drop your bombs.

Pe-2 110 series



Type: Dive / Level Bomber

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------|----|---------------------------------|
| 1 | Pilot's Direction Indicator | 18 | Fuel Pressure (Engine #2) |
| 2 | Flaps Indicator Light | 19 | Oil Pressure (Engine #1) |
| 3 | Flaps Position Indicator | 20 | Oil Pressure (Engine #2) |
| 4 | Compass | 21 | Oil Temperature (Engine #1) |
| 5 | Airspeed Indicator | 22 | Oil Temperature (Engine #2) |
| 6 | Artificial Horizon | 23 | Coolant Temperature (Engine #1) |
| 7 | Variometer | 24 | Coolant Temperature (Engine #2) |
| 8 | Turn & Bank Indicator | 25 | Navigation Airspeed |
| 9 | Altimeter | 26 | Navigation Altitude |
| 10 | Fuel Level | 27 | Compass |
| 11 | Fuel Tank Selector Switch | 28 | Oxygen Systems |
| 12 | Manifold Pressure(Engine #1) | 29 | Hydraulic Pressure |
| 13 | Manifold Pressure(Engine #2) | 30 | Air Pressure |
| 14 | RPM Indicator (Engine #1) | 31 | Elevator Trim Light |
| 15 | RPM Indicator (Engine #2) | 32 | Landing Gear Indicator Lights |
| 16 | Inertia Gas Indicator | 33 | G-Load Warning Light |
| 17 | Fuel Pressure (Engine #1) | 34 | External Ordnance Status Lights |

(Pe-2 continued)

Other Playable Crew Positions:



Level Bombsight



Rear Gunner

At a Glance:

Engine:

2 x M-105PA

Power: 1,100 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 2 x 12.7mm MG (BK);
- 1 x 12.7mm MG (UBT or UBK);
- Up to 1,000 kg of bombs.

Advantages:

- Strong armament;
- Improved armor protection.

Disadvantages:

- Insufficient field of vision in lower front hemisphere;
- Increased weight;
- Lower speed.

Pilot Notes:

- Supercharger speeds need to be switched at 3,100 meters.
- Mixture adjustment is as follows: 100% at 3,200 m; 80% at 4,600 m; 60% at 6,300 m; and 40% at 8,400 m.
- While ostensibly a dive bomber, the Pe-2 is excellent in almost every ground attack mode. It can dive-bomb, level bomb, and strafe.
- The biggest weakness of the Pe-2 is its vulnerability to enemy fire. It can't take punishment nearly as well as its famous counterpart, the Il-2. Therefore, it should only be used as a dive bomber, or as a low-level attack aircraft, when enemy opposition is expected to be low.
- For well defended areas, the Pe-2 is best used as a medium-altitude level bomber.

(Pe-2 continued)

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Once the target passes under the crosshairs, the bombardier must drop the bombs manually.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to point the bombsight towards the projected impact point. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. The *bead* symbol along the outer ring of numbers shows the combined Altitude / Airspeed input. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle. As the sight angle changes, note the *ring* symbol moving along the outer ring of symbols.
- Align the *ring* with the *bead*. With them aligned, the bomb sight is pointing at the projected impact point for the currently entered altitude / airspeed parameters.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course.
- Once you see your target pass through the sight center bubble, press the Weapon 4 button to drop your bombs.

Pe-2 359 series



Type: Dive / Level Bomber

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|-------------------------------------|----|--|
| 1 | <i>Pilot's Direction Indicator</i> | 18 | <i>Fuel Pressure (Engine #2)</i> |
| 2 | <i>Flaps Indicator Light</i> | 19 | <i>Oil Pressure (Engine #1)</i> |
| 3 | <i>Flaps Position Indicator</i> | 20 | <i>Oil Pressure (Engine #2)</i> |
| 4 | <i>Compass</i> | 21 | <i>Oil Temperature (Engine #1)</i> |
| 5 | <i>Airspeed Indicator</i> | 22 | <i>Oil Temperature (Engine #2)</i> |
| 6 | <i>Artificial Horizon</i> | 23 | <i>Coolant Temperature (Engine #1)</i> |
| 7 | <i>Variometer</i> | 24 | <i>Coolant Temperature (Engine #2)</i> |
| 8 | <i>Turn & Bank Indicator</i> | 25 | <i>Navigation Airspeed</i> |
| 9 | <i>Altimeter</i> | 26 | <i>Navigation Altitude</i> |
| 10 | <i>Fuel Level</i> | 27 | <i>Compass</i> |
| 11 | <i>Fuel Tank Selector Switch</i> | 28 | <i>Oxygen Systems</i> |
| 12 | <i>Manifold Pressure(Engine #1)</i> | 29 | <i>Hydraulic Pressure</i> |
| 13 | <i>Manifold Pressure(Engine #2)</i> | 30 | <i>Air Pressure</i> |
| 14 | <i>RPM Indicator (Engine #1)</i> | 31 | <i>Elevator Trim Light</i> |
| 15 | <i>RPM Indicator (Engine #2)</i> | 32 | <i>Landing Gear Indicator Lights</i> |
| 16 | <i>Inertia Gas Indicator</i> | 33 | <i>G-Load Warning Light</i> |
| 17 | <i>Fuel Pressure (Engine #1)</i> | 34 | <i>External Ordnance Status Lights</i> |

(Pe-2 continued)

Other Playable Crew Positions:



Level Bombsight



Rear Gunner

At a Glance:

Engine:

2 x M-105PF.

Power: 1,210 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 2 x 12.7mm MG (BK);
- 1 x 12.7mm MG (UBT or UBK);
- Up to 1,000 kg of bombs.

Advantages:

- Strong armament;
- Improved aerodynamics;
- Excellent performance at altitudes up to 4,000m.

Disadvantages:

- Increased weight;
- Reduced range and service ceiling.

Pilot Notes:

- Supercharger speeds need to be switched at 2,800 meters.
- Mixture adjustment is as follows: 100% at 1,650 m; 80% at 3,150 m; 60% at 4,850 m; 40% at 7,000 m; and 20% at 9,800 m.
- While ostensibly a dive bomber, the Pe-2 is excellent in almost every ground attack mode. It can dive-bomb, level bomb, and strafe.
- The biggest weakness of the Pe-2 is its vulnerability to enemy fire. It can't take punishment nearly as well as its famous counterpart, the Il-2. Therefore, it should only be used as a dive bomber, or as a low-level attack aircraft, when enemy opposition is expected to be low.
- For well defended areas, the Pe-2 is best used as a medium-altitude level bomber.

(Pe-2 continued)

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Once the target passes under the crosshairs, the bombardier must drop the bombs manually.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to point the bombsight towards the projected impact point. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. The *bead* symbol along the outer ring of numbers shows the combined Altitude / Airspeed input. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle. As the sight angle changes, note the *ring* symbol moving along the outer ring of symbols.
- Align the *ring* with the *bead*. With them aligned, the bomb sight is pointing at the projected impact point for the currently entered altitude / airspeed parameters.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course.
- Once you see your target pass through the sight center bubble, press the Weapon 4 button to drop your bombs.

Pe-3



Type: Heavy Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------|----|---------------------------------|
| 1 | Flaps Indicator Light | 18 | Fuel Pressure (Engine #2) |
| 2 | Flaps Position Indicator | 19 | Oil Pressure (Engine #1) |
| 3 | Gunsight Dial | 20 | Oil Pressure (Engine #2) |
| 4 | Compass | 21 | Oil Temperature (Engine #1) |
| 5 | Airspeed Indicator | 22 | Oil Temperature (Engine #2) |
| 6 | Artificial Horizon | 23 | Coolant Temperature (Engine #1) |
| 7 | Variometer | 24 | Coolant Temperature (Engine #2) |
| 8 | Turn & Bank Indicator | 25 | Navigation Airspeed |
| 9 | Altimeter | 26 | Navigation Altitude |
| 10 | Fuel Level | 27 | Free Air Temperature |
| 11 | Fuel Tank Selector Switch | 28 | Compass |
| 12 | Manifold Pressure(Engine #1) | 29 | Hydraulic Pressure |
| 13 | Manifold Pressure(Engine #2) | 30 | Air Pressure |
| 14 | RPM Indicator (Engine #1) | 31 | Elevator Trim Light |
| 15 | RPM Indicator (Engine #2) | 32 | Landing Gear Indicator Lights |
| 16 | Inertia Gas Indicator | 33 | G-Load Warning Light |
| 17 | Fuel Pressure (Engine #1) | | |

(Pe-3 continued)

Other Playable Crew Positions:



Rear Gunner

At a Glance:

Engine:

2 x M-105RA.

Power: 1,100 HP

Armament:

- 2 x 7.62mm MG (ShKAS);
- 2 x 12.7mm MG (BK);
- Up to 1,000 kg of bombs.

Advantages:

- Excellent long-range heavy fighter;
- Long range;
- Easy to fly.

Disadvantages:

- No crew armor in the front;
- Insufficient armament;
- Weak radio;
- No radio navigation equipment;
- Some unreliable electric devices.

Pilot Notes:

- Supercharger speeds need to be switched at 3,100 meters.
- Mixture adjustment is as follows: 100% at 3,200 m; 80% at 4,600 m; 60% at 6,300 m; and 40% at 8,400 m.
- The Pe-3 is slow and not very maneuverable for a fighter, but it packs a powerful punch, and is a very stable gun platform.
- The Pe-3 is generally a sitting duck against enemy fighters, and as such it should only be used as a bomber interceptor.
- The Pe-3, like all other planes of the Pe-2 series, does not absorb a lot of damage, and thus it's best not to expose it to enemy defensive fire.

Pe-3bis



Type: Heavy Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------|----|---------------------------------|
| 1 | Flaps Indicator Light | 18 | Fuel Pressure (Engine #2) |
| 2 | Flaps Position Indicator | 19 | Oil Pressure (Engine #1) |
| 3 | Gunsight Dial | 20 | Oil Pressure (Engine #2) |
| 4 | Compass | 21 | Oil Temperature (Engine #1) |
| 5 | Airspeed Indicator | 22 | Oil Temperature (Engine #2) |
| 6 | Artificial Horizon | 23 | Coolant Temperature (Engine #1) |
| 7 | Variometer | 24 | Coolant Temperature (Engine #2) |
| 8 | Turn & Bank Indicator | 25 | Navigation Airspeed |
| 9 | Altimeter | 26 | Navigation Altitude |
| 10 | Fuel Level | 27 | Compass |
| 11 | Fuel Tank Selector Switch | 28 | Oxygen Systems |
| 12 | Manifold Pressure(Engine #1) | 29 | Hydraulic Pressure |
| 13 | Manifold Pressure(Engine #2) | 30 | Air Pressure |
| 14 | RPM Indicator (Engine #1) | 31 | Elevator Trim Light |
| 15 | RPM Indicator (Engine #2) | 32 | Landing Gear Indicator Lights |
| 16 | Inertia Gas Indicator | 33 | G-Load Warning Light |
| 17 | Fuel Pressure (Engine #1) | | |

(Pe-3 continued)

Other Playable Crew Positions:



Rear Gunner

At a Glance:

Engine:

2 x M-105RA.

Power: 1,100 HP

Armament:

- 1 x 7.62mm MG (ShKAS);
- 3x12.7mm MG (UBK);
- 1 x 20mm cannon (ShVAK);
- Up to 700 kg.

Advantages:

- Excellent long-range heavy fighter;
- Strong armament;
- Good armor protection;
- Long range;
- Easy to fly.

Disadvantages:

- Weak radio;
- No radio navigation equipment;
- Poor field of vision in the front hemisphere.

Pilot Notes:

- Supercharger speeds need to be switched at 3,100 meters.
- Mixture adjustment is as follows: 100% at 3,200 m; 80% at 4,600 m; 60% at 6,300 m; and 40% at 8,400 m.
- The Pe-3 is slow and not very maneuverable for a fighter, but it packs a powerful punch, and is a very stable gun platform.
- The Pe-3 is generally a sitting duck against enemy fighters, and as such it should only be used as a bomber interceptor.
- The Pe-3, like all other planes of the Pe-2 series, does not absorb a lot of damage, and thus it's best not to expose it to enemy defensive fire.

SBD-3



Type: Carrier-Borne Dive Bomber

Major Users: USA

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|----------------------------|
| 1 | RPM Indicator | 9 | Variometer |
| 2 | Manifold Pressure | 10 | Clock |
| 3 | Altimeter | 11 | Cylinder Head Temperature |
| 4 | Compass | 12 | Suction Gauge |
| 5 | Artificial Horizon | 13 | Oil Temperature |
| 6 | Oil Temp & Pressure; Fuel Pressure | 14 | Fuel Level |
| 7 | Airspeed Indicator | 15 | Compass (not shown) |
| 8 | Turn & Bank Indicator | | |

Other Playable Crew Positions:



Rear Gunner

(SBD continued)

At a Glance:

Engine:

1 x R-1820-52

Power: 1,000 HP

Advantages:

- Stable gun platform;
- Good defensive field of fire.

Armament:

- 2 x .50 cal MG;
- 2 x .30 cal MG rear cockpit;
- Bombs: 1 x 1,600 lb or 2 x 147 kg.
- External Fuel: 2 x 220 L.

Disadvantages:

- Mediocre performance;
- Insufficient armor protection;
- Unstable in dive (partially solved by perforated flaps).

SBD-5



Type: Carrier-Borne Dive Bomber

Major Users: USA

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|----------------------------|
| 1 | RPM Indicator | 9 | Variometer |
| 2 | Manifold Pressure | 10 | Clock |
| 3 | Altimeter | 11 | Cylinder Head Temperature |
| 4 | Compass | 12 | Suction Gauge |
| 5 | Artificial Horizon | 13 | Oil Temperature |
| 6 | Oil Temp & Pressure; Fuel Pressure | 14 | Fuel Level |
| 7 | Airspeed Indicator | 15 | Compass (not shown) |
| 8 | Turn & Bank Indicator | | |

Other Playable Crew Positions:



Rear Gunner

(SBD continued)

At a Glance:

Engine:

1 x R-1820-60

Power: 1,200 HP

Advantages:

- Stable gun platform;
- Good defensive field of fire.

Armament:

- 2 x .50 cal MG;
- 2 x .30 cal MG rear cockpit;
- Bombs: 1 x 1,600 lb or 2 x 147 kg.
- External Fuel: 2 x 220 L.

Disadvantages:

- Mediocre performance;
- Insufficient armor protection;
- Unstable in dive (partially solved by perforated flaps).

Spitfire Mk Vb



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|---------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 11 | Oil Temperature |
| 2 | Artificial Horizon | 12 | Coolant Temperature |
| 3 | Variometer | 13 | Fuel Level |
| 4 | Altimeter | 14 | Compass |
| 5 | Compass | 15 | Oxygen Altitude |
| 6 | Turn & Bank Indicator | 16 | Oxygen Supply |
| 7 | RPM Indicator | 17 | Clock |
| 8 | Fuel Level Warning Light | 18 | Landing Gear Indicator Lights |
| 9 | Manifold Pressure | 19 | Elevator Trim Indicator |
| 10 | Oil Pressure | 20 | Internal System Indicator |

(Spitfire continued)

At a Glance:

Engine:

1 x 45

Power: 1,470 HP

Armament:

- 2 x 20mm HS.404 cannons
- 4 x .303 machine guns
- 500 lb of bombs

Advantages:

- Excellent maneuverability;
- Good speed characteristics compared to mid-war adversaries;
- Adequate firepower

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire Mk Vb CW



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|---------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 11 | Oil Temperature |
| 2 | Artificial Horizon | 12 | Coolant Temperature |
| 3 | Variometer | 13 | Fuel Level |
| 4 | Altimeter | 14 | Compass |
| 5 | Compass | 15 | Oxygen Altitude |
| 6 | Turn & Bank Indicator | 16 | Oxygen Supply |
| 7 | RPM Indicator | 17 | Clock |
| 8 | Fuel Level Warning Light | 18 | Landing Gear Indicator Lights |
| 9 | Manifold Pressure | 19 | Elevator Trim Indicator |
| 10 | Oil Pressure | 20 | Internal System Indicator |

(Spitfire continued)

At a Glance:

Engine:

1 x 45

Power: 1,470 HP

Armament:

- 2 x 20mm HS.404 cannons
- 4 x .303 machine guns
- 500 lb of bombs

Advantages:

- Excellent maneuverability;
- Good speed characteristics compared to mid-war adversaries;
- Adequate firepower.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire LF Mk Vb



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|---------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 11 | Oil Temperature |
| 2 | Artificial Horizon | 12 | Coolant Temperature |
| 3 | Variometer | 13 | Fuel Level |
| 4 | Altimeter | 14 | Compass |
| 5 | Compass | 15 | Oxygen Altitude |
| 6 | Turn & Bank Indicator | 16 | Oxygen Supply |
| 7 | RPM Indicator | 17 | Clock |
| 8 | Fuel Level Warning Light | 18 | Landing Gear Indicator Lights |
| 9 | Manifold Pressure | 19 | Elevator Trim Indicator |
| 10 | Oil Pressure | 20 | Internal System Indicator |

(Spitfire continued)

At a Glance:

Engine:

1 x 45

Power: 1,470 HP

Armament:

- 2 x 20mm HS.404 cannons
- 4 x .303 machine guns
- 500 lb of bombs

Advantages:

- Excellent maneuverability;
- Good speed characteristics compared to mid-war adversaries;
- Adequate firepower.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire LF MK Vb CW



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|---------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 11 | Oil Temperature |
| 2 | Artificial Horizon | 12 | Coolant Temperature |
| 3 | Variometer | 13 | Fuel Level |
| 4 | Altimeter | 14 | Compass |
| 5 | Compass | 15 | Oxygen Altitude |
| 6 | Turn & Bank Indicator | 16 | Oxygen Supply |
| 7 | RPM Indicator | 17 | Clock |
| 8 | Fuel Level Warning Light | 18 | Landing Gear Indicator Lights |
| 9 | Manifold Pressure | 19 | Elevator Trim Indicator |
| 10 | Oil Pressure | 20 | Internal System Indicator |

(Spitfire continued)

At a Glance:

Engine:

1 x 45

Power: 1,470 HP

Armament:

- 2 x 20mm HS.404 cannons
- 4 x .303 machine guns
- 500 lb of bombs

Advantages:

- Excellent maneuverability;
- Good speed characteristics compared to mid-war adversaries;
- Adequate firepower.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire LF Mk Vc (2)



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|---------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 11 | Oil Temperature |
| 2 | Artificial Horizon | 12 | Coolant Temperature |
| 3 | Variometer | 13 | Fuel Level |
| 4 | Altimeter | 14 | Compass |
| 5 | Compass | 15 | Oxygen Altitude |
| 6 | Turn & Bank Indicator | 16 | Oxygen Supply |
| 7 | RPM Indicator | 17 | Clock |
| 8 | Fuel Level Warning Light | 18 | Landing Gear Indicator Lights |
| 9 | Manifold Pressure | 19 | Elevator Trim Indicator |
| 10 | Oil Pressure | 20 | Internal System Indicator |

(Spitfire continued)

At a Glance:

Engine:

1 x 45

Power: 1,470 HP

Armament:

- 2 x 20mm HS.404 cannons
- 500 lb of bombs

Advantages:

- Excellent maneuverability;
- Good speed characteristics compared to mid-war adversaries;
- Tremendous firepower.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire LF Mk Vc (4)



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|---------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 11 | Oil Temperature |
| 2 | Artificial Horizon | 12 | Coolant Temperature |
| 3 | Variometer | 13 | Fuel Level |
| 4 | Altimeter | 14 | Compass |
| 5 | Compass | 15 | Oxygen Altitude |
| 6 | Turn & Bank Indicator | 16 | Oxygen Supply |
| 7 | RPM Indicator | 17 | Clock |
| 8 | Fuel Level Warning Light | 18 | Landing Gear Indicator Lights |
| 9 | Manifold Pressure | 19 | Elevator Trim Indicator |
| 10 | Oil Pressure | 20 | Internal System Indicator |

(Spitfire continued)

At a Glance:

Engine:

1 x 45

Power: 1,470 HP

Armament:

- 4 x 20mm HS.404 cannons
- 500 lb of bombs

Advantages:

- Excellent maneuverability;
- Good speed characteristics compared to mid-war adversaries;
- Tremendous firepower.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire Mk VIII



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|----------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 11 | Oil Temperature |
| 2 | Artificial Horizon | 12 | Coolant Temperature |
| 3 | Variometer | 13 | Fuel Level |
| 4 | Altimeter | 14 | Compass |
| 5 | Compass | 15 | Oxygen Altitude |
| 6 | Turn & Bank Indicator | 16 | Oxygen Supply |
| 7 | RPM Indicator | 17 | Landing Gear Indicator Lights |
| 8 | Supercharger Warning Light | 18 | Elevator Trim Indicator |
| 9 | Manifold Pressure | 19 | Internal System Indicator |
| 10 | Oil Pressure | | |

(Spitfire continued)

At a Glance:

Engine:

1 x 66

Power: 1,720 HP

Armament:

- 2 x 20mm HS.404 cannons
- 4 x .303 machine guns

Advantages:

- Excellent maneuverability;
- Good speed characteristics;
- Adequate firepower.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire Mk VIII CW



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|----------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 11 | Oil Temperature |
| 2 | Artificial Horizon | 12 | Coolant Temperature |
| 3 | Variometer | 13 | Fuel Level |
| 4 | Altimeter | 14 | Compass |
| 5 | Compass | 15 | Oxygen Altitude |
| 6 | Turn & Bank Indicator | 16 | Oxygen Supply |
| 7 | RPM Indicator | 17 | Landing Gear Indicator Lights |
| 8 | Supercharger Warning Light | 18 | Elevator Trim Indicator |
| 9 | Manifold Pressure | 19 | Internal System Indicator |
| 10 | Oil Pressure | | |

(Spitfire continued)

At a Glance:

Engine:

1 x 66

Power: 1,720 HP

Armament:

- 2 x 20mm HS.404 cannons
- 4 x .303 machine guns

Advantages:

- Excellent maneuverability;
- Good speed characteristics;
- Adequate firepower.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire Mk IXc



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|----------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 12 | Coolant Temperature |
| 2 | Artificial Horizon | 13 | Fuel Level Warning Light |
| 3 | Variometer | 14 | Fuel Level |
| 4 | Altimeter | 15 | Oxygen Altitude |
| 5 | Compass | 16 | Oxygen Supply |
| 6 | Turn & Bank Indicator | 17 | Clock |
| 7 | RPM Indicator | 18 | Landing Gear Indicator Lights |
| 8 | Supercharger Warning Light | 19 | Elevator Trim Indicator |
| 9 | Manifold Pressure | 20 | Internal System Indicator |
| 10 | Oil Pressure | 21 | Compass |
| 11 | Oil Temperature | | |

(Spitfire continued)

At a Glance:

Engine:

1 x 61

Power: 1,660 HP

Armament:

- 2 x 20mm HS.404 cannons
- 4 x .50-cal machine guns

Advantages:

- Excellent maneuverability;
- Excellent speed characteristics;
- Adequate firepower.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire LF Mk IXc CW



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|----------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 12 | Coolant Temperature |
| 2 | Artificial Horizon | 13 | Fuel Level Warning Light |
| 3 | Variometer | 14 | Fuel Level |
| 4 | Altimeter | 15 | Oxygen Altitude |
| 5 | Compass | 16 | Oxygen Supply |
| 6 | Turn & Bank Indicator | 17 | Clock |
| 7 | RPM Indicator | 18 | Landing Gear Indicator Lights |
| 8 | Supercharger Warning Light | 19 | Elevator Trim Indicator |
| 9 | Manifold Pressure | 20 | Internal System Indicator |
| 10 | Oil Pressure | 21 | Compass |
| 11 | Oil Temperature | | |

(Spitfire continued)

At a Glance:

Engine:

1 x 61

Power: 1,660 HP

Armament:

- 2 x 20mm HS.404 cannons
- 4 x .50-cal machine guns

Advantages:

- Excellent maneuverability;
- Excellent speed characteristics;
- Adequate firepower.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire Mk IXe



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|----------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 12 | Coolant Temperature |
| 2 | Artificial Horizon | 13 | Fuel Level Warning Light |
| 3 | Variometer | 14 | Fuel Level |
| 4 | Altimeter | 15 | Oxygen Altitude |
| 5 | Compass | 16 | Oxygen Supply |
| 6 | Turn & Bank Indicator | 17 | Clock |
| 7 | RPM Indicator | 18 | Landing Gear Indicator Lights |
| 8 | Supercharger Warning Light | 19 | Elevator Trim Indicator |
| 9 | Manifold Pressure | 20 | Internal System Indicator |
| 10 | Oil Pressure | 21 | Compass |
| 11 | Oil Temperature | | |

(Spitfire continued)

At a Glance:

Engine:

1 x 70

Power: 1,650 HP

Armament:

- 2 x 20mm HS.404 cannons
- 2 x .50-cal machine guns

Advantages:

- Excellent maneuverability;
- Excellent speed characteristics.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire HF Mk IXe



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|----------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 12 | Coolant Temperature |
| 2 | Artificial Horizon | 13 | Fuel Level Warning Light |
| 3 | Variometer | 14 | Fuel Level |
| 4 | Altimeter | 15 | Oxygen Altitude |
| 5 | Compass | 16 | Oxygen Supply |
| 6 | Turn & Bank Indicator | 17 | Clock |
| 7 | RPM Indicator | 18 | Landing Gear Indicator Lights |
| 8 | Supercharger Warning Light | 19 | Elevator Trim Indicator |
| 9 | Manifold Pressure | 20 | Internal System Indicator |
| 10 | Oil Pressure | 21 | Compass |
| 11 | Oil Temperature | | |

(Spitfire continued)

At a Glance:

Engine:

1 x 70

Power: 1,650 HP

Armament:

- 2 x 20mm HS.404 cannons
- 2 x .50-cal machine guns

Advantages:

- Excellent maneuverability;
- Excellent speed characteristics.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire LF Mk IXe CW



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|----------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 12 | Coolant Temperature |
| 2 | Artificial Horizon | 13 | Fuel Level Warning Light |
| 3 | Variometer | 14 | Fuel Level |
| 4 | Altimeter | 15 | Oxygen Altitude |
| 5 | Compass | 16 | Oxygen Supply |
| 6 | Turn & Bank Indicator | 17 | Clock |
| 7 | RPM Indicator | 18 | Landing Gear Indicator Lights |
| 8 | Supercharger Warning Light | 19 | Elevator Trim Indicator |
| 9 | Manifold Pressure | 20 | Internal System Indicator |
| 10 | Oil Pressure | 21 | Compass |
| 11 | Oil Temperature | | |

(Spitfire continued)

At a Glance:

Engine:

1 x 70

Power: 1,650 HP

Armament:

- 2 x 20mm HS.404 cannons
- 2 x .50-cal machine guns

Advantages:

- Excellent maneuverability;
- Excellent speed characteristics.

Disadvantages:

- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Spitfire Mk IX 25 lbs



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|----------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 12 | Coolant Temperature |
| 2 | Artificial Horizon | 13 | Fuel Level Warning Light |
| 3 | Variometer | 14 | Fuel Level |
| 4 | Altimeter | 15 | Oxygen Altitude |
| 5 | Compass | 16 | Oxygen Supply |
| 6 | Turn & Bank Indicator | 17 | Clock |
| 7 | RPM Indicator | 18 | Landing Gear Indicator Lights |
| 8 | Supercharger Warning Light | 19 | Elevator Trim Indicator |
| 9 | Manifold Pressure | 20 | Internal System Indicator |
| 10 | Oil Pressure | 21 | Compass |
| 11 | Oil Temperature | | |

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Seafire F MK III



Type: Carrier-Borne Fighter

Major Users: Royal Navy

Cockpit Guide:



- | | | | |
|----|---------------------------|----|--------------------------------|
| 1 | Airspeed Indicator | 12 | Coolant Temperature |
| 2 | Artificial Horizon | 13 | Fuel Level |
| 3 | Variometer | 14 | Oxygen Altitude |
| 4 | Altimeter | 15 | Oxygen Supply |
| 5 | Compass | 16 | Clock |
| 6 | Turn & Bank Indicator | 17 | Landing Gear Indicator Lights |
| 7 | RPM Indicator | 18 | Arresting Hook Indicator Light |
| 8 | Fuel Level Warning Light | 19 | Elevator Trim Indicator |
| 9 | Manifold Pressure | 20 | Internal System Indicator |
| 10 | Oil Pressure | 21 | Compass |
| 11 | Oil Temperature | | |

(Seafire continued)

At a Glance:

Engine:

1 x 55

Power: 1,470 HP

Armament:

- 2 x 20mm cannon
- 4 x .30 cal MG

Advantages:

- Excellent maneuverability;
- Well-armed.

Disadvantages:

- Poor ground handling
- Inadequate visibility while taxiing;
- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

Seafire L MK III



Type: Carrier-Borne Fighter

Major Users: Royal Navy

Cockpit Guide:



1 ***Airspeed Indicator***

2 ***Artificial Horizon***

3 ***Variometer***

4 ***Altimeter***

5 ***Compass***

6 ***Turn & Bank Indicator***

7 ***RPM Indicator***

8 ***Fuel Level Warning Light***

9 ***Manifold Pressure***

10 ***Oil Pressure***

11 ***Oil Temperature***

12 ***Coolant Temperature***

13 ***Fuel Level***

14 ***Oxygen Altitude***

15 ***Oxygen Supply***

16 ***Clock***

17 ***Landing Gear Indicator Lights***

18 ***Arresting Hook Indicator Light***

19 ***Elevator Trim Indicator***

20 ***Internal System Indicator***

21 ***Compass***

(Seafire continued)

At a Glance:

Engine:

1 x 55

Power: 1,470 HP

Armament:

- 2 x 20mm cannon
- 4 x .30 cal MG

Advantages:

- Excellent maneuverability;
- Well-armed.

Disadvantages:

- Poor ground handling
- Inadequate visibility while taxiing;
- Short range.

Pilot Notes:

- Supercharger speeds are changed automatically, and no player intervention is required.
- Mixture adjustment is also automatic and requires no player input.

TB-3 4M-17



Type: Heavy Bomber

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|------------------------------------|
| 1 | <i>Pilot's Direction Indicator</i> | 12 | <i>RPM Indicator (Engine #4)</i> |
| 2 | <i>Artificial Horizon</i> | 13 | <i>Artificial Horizon</i> |
| 3 | Airspeed Indicator | 14 | <i>Pilot's Direction Indicator</i> |
| 4 | <i>Turn & Bank Indicator</i> | 15 | Altimeter |
| 5 | <i>Variometer</i> | 16 | <i>Turn & Bank Indicator</i> |
| 6 | Altimeter | 17 | Airspeed Indicator |
| 7 | <i>Clock</i> | 18 | Compass |
| 8 | Compass | 19 | <i>Oxygen Gauges</i> |
| 9 | <i>RPM Indicator (Engine #1)</i> | 20 | <i>Oxygen Apparatus</i> |
| 10 | <i>RPM Indicator (Engine #2)</i> | 21 | <i>Oxygen Apparatus</i> |
| 11 | <i>RPM Indicator (Engine #3)</i> | | |

(TB-3 continued)

Other Playable Crew Positions:



Bombardier



Nose Gunner



Waist Gunner 1



Waist Gunner 2

At a Glance:

Engine:

4 x M-17F

Power:

Indicated: 500 HP
Take-off: 730 HP

Armament:

- 2,000 kg of bombs;
- 6 x 7.62mm MG (Defensive)

Advantages:

- Sturdy construction;
- Easy to fly;
- Slow cruise speed provides for very accurate bombing

Disadvantages:

- Low speed makes the plane into a very easy target.

Pilot Notes:

Take-Off Speed: 100 km/h

Landing Speed: 95 km/h

Combat Engine Setting: 1,400 RPM

Best Cruise: 1,200 RPM

Economy Cruise: 1,150 RPM

Prop Pitch Control: None

Mixture Control: None

Boost: No

Supercharger: No

- TB-3 is a very slow heavy bomber. Its climb and accelerations are poor but it's a very stable and accurate bombing platform at lower speeds and altitudes. Generally all bombing missions should be performed from 500-1,000 meters and speeds around 150 km/h.
- TB-3 is a very sturdy airplane and can take a lot of hits in the wings and the fuselage. However the crew is exposed to enemy fire and the engines are rather easily set on fire.
- Each M-17 engine is equipped with multiple-charge fire extinguishers, which should be fired the moment the engine catches fire. Occasionally you will be able to extinguish the fire and regain full control of the engine.
- TB-3 can easily fly on two engines, and glide to normal landing for short distances even on one engine.

(TB-3 continued)

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Once the target passes under the crosshairs, the bombardier must drop the bombs manually.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bomb sight will point towards the projected impact point for the currently entered altitude / airspeed parameters. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics.
- The intersection of the central vertical line and the horizontal curved line form a crosshair. The bombardier must release the bombs manually when the target is under this intersection.
- Once you see your target pass under the intersecting lines, press the Weapon 4 button to drop your bombs.

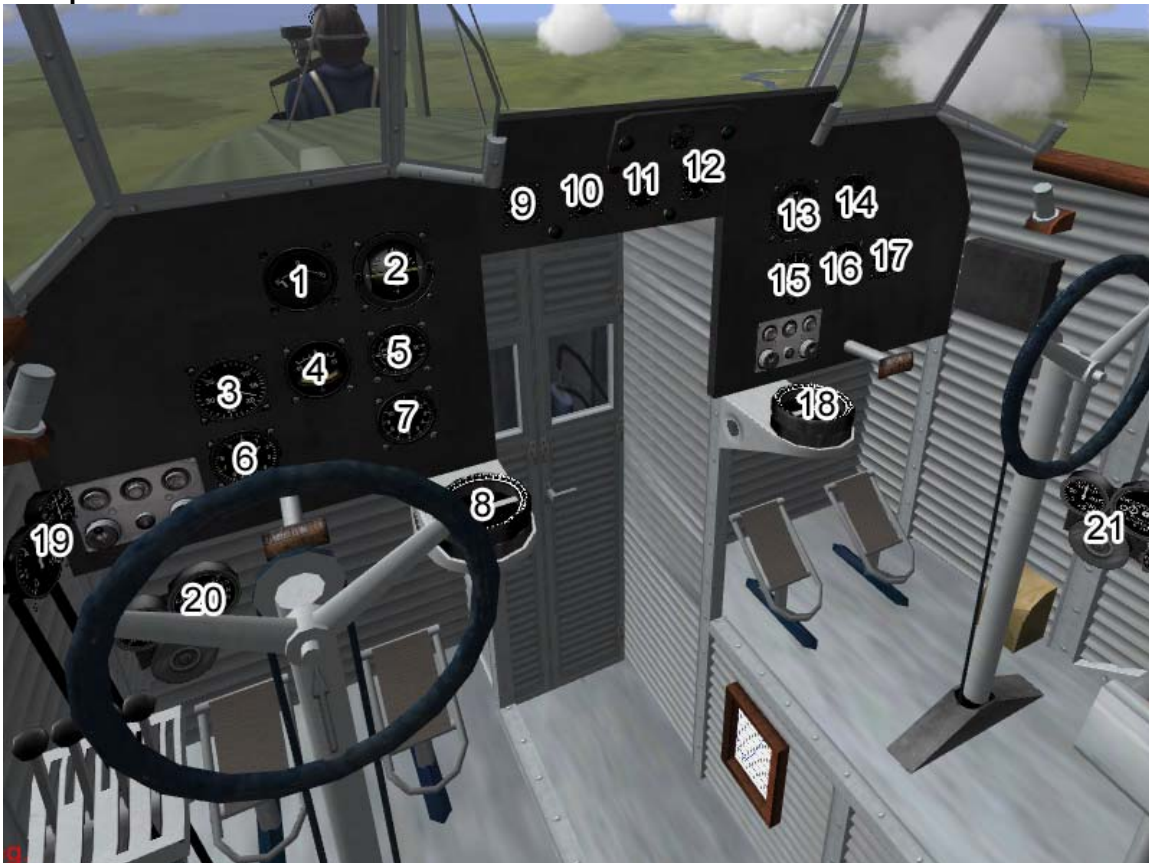
TB-3 4M-34R



Type: Heavy Bomber

Major Users: USSR

Cockpit Guide:



- | | | | |
|----|-----------------------------|----|-----------------------------|
| 1 | Pilot's Direction Indicator | 12 | RPM Indicator (Engine #4) |
| 2 | Artificial Horizon | 13 | Artificial Horizon |
| 3 | Airspeed Indicator | 14 | Pilot's Direction Indicator |
| 4 | Turn & Bank Indicator | 15 | Altimeter |
| 5 | Variometer | 16 | Turn & Bank Indicator |
| 6 | Altimeter | 17 | Airspeed Indicator |
| 7 | Clock | 18 | Compass |
| 8 | Compass | 19 | Oxygen Gauges |
| 9 | RPM Indicator (Engine #1) | 20 | Oxygen Apparatus |
| 10 | RPM Indicator (Engine #2) | 21 | Oxygen Apparatus |
| 11 | RPM Indicator (Engine #3) | | |

(TB-3 continued)

Other Playable Crew Positions:



Bombardier



Nose Gunner



Waist Gunner



Tail Gunner

At a Glance:

Engine:

4 x M-34

Power:

Indicated: 750 HP

Take-off: 850 HP

Armament:

- 2,000 kg of bombs;
- 6 x 7.62mm MG (ShKAS).

Advantages:

- Sturdy construction;
- Easy to fly;
- Slow cruise speed provides for very accurate bombing;
- Excellent defensive coverage.

Disadvantages:

- Slow top speed makes the plane into a very easy target.

Pilot Notes:

Take-Off Speed: 100 km/h

Landing Speed: 95 km/h

Combat Engine Setting: 1,400 RPM

Best Cruise: 1,200 RPM

Economy Cruise: 1,150 RPM

Prop Pitch Control: None

Mixture Control: None

Boost: No

Supercharger: No

- TB-3 is a very slow heavy bomber. Its climb and accelerations are poor but it's a very stable and accurate bombing platform at lower speeds and altitudes. Generally all bombing missions should be performed from 500-1,000 meters and speeds around 150 km/h.
- TB-3 is a very sturdy airplane and can take a lot of hits in the wings and the fuselage. However the crew is exposed to enemy fire and the engines are rather easily set on fire.
- Each engine is equipped with multiple-charge fire extinguishers, which should be fired the moment the engine catches fire. Occasionally you will be able to extinguish the fire and regain full control of the engine.
- TB-3 can easily fly on two engines, and glide to normal landing for short distances even on one engine.

(TB-3 continued)

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Once the target passes under the crosshairs, the bombardier must drop the bombs manually.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bomb sight will point towards the projected impact point for the currently entered altitude / airspeed parameters. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics.
- The intersection of the central vertical line and the horizontal curved line form a crosshair. The bombardier must release the bombs manually when the target is under this intersection.
- Once you see your target pass under the intersecting lines, press the Weapon 4 button to drop your bombs.

•

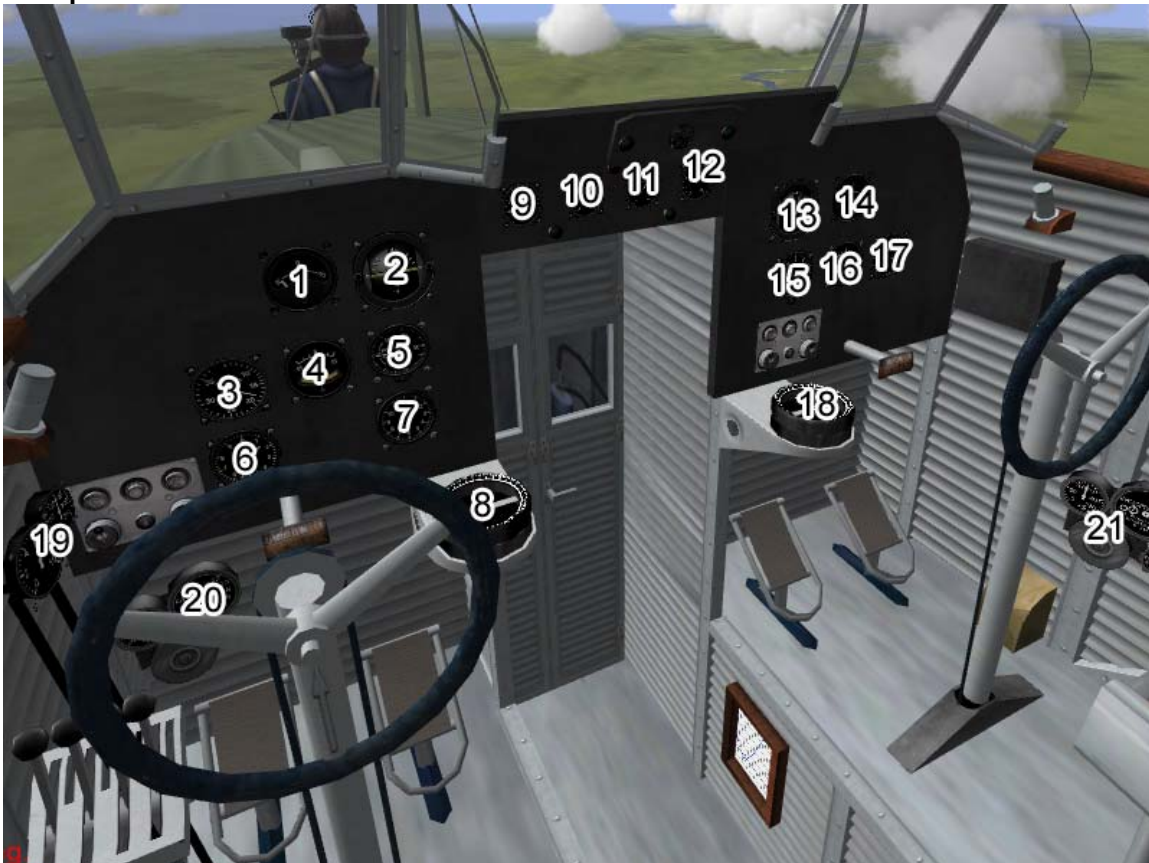
TB-3 4M-34R SPB



Type: Mothership / Heavy Bomber

Major Users: USSR

Cockpit Guide:



- 1 Pilot's Direction Indicator
- 2 Artificial Horizon
- 3 **Airspeed Indicator**
- 4 Turn & Bank Indicator
- 5 Variometer
- 6 **Altimeter**
- 7 Clock
- 8 **Compass**
- 9 RPM Indicator (Engine #1)
- 10 RPM Indicator (Engine #2)
- 11 RPM Indicator (Engine #3)

- 12 RPM Indicator (Engine #4)
- 13 Artificial Horizon
- 14 Pilot's Direction Indicator
- 15 **Altimeter**
- 16 Turn & Bank Indicator
- 17 **Airspeed Indicator**
- 18 **Compass**
- 19 Oxygen Gauges
- 20 Oxygen Apparatus
- 21 Oxygen Apparatus

(TB-3 continued)

Other Playable Crew Positions:



Bombardier



Nose Gunner



Waist Gunner



Tail Gunner

At a Glance:

Engine:

4 x M-34

Power:

Indicated: 750 HP

Take-off: 850 HP

Armament:

- 2,000 kg of bombs;
- 6 x 7.62mm MG (ShKAS).

Advantages:

- Sturdy construction;
- Easy to fly;
- Slow cruise speed provides for very accurate bombing;
- Excellent defensive coverage.

Disadvantages:

- Slow top speed makes the plane into a very easy target.

Using the SPB

- The SPB consists of the TB-3 mothership and a pair of attached I-16s. There are special versions of these, TB-3 4M-34R SPB and I-16type24 SPB.
- When building a mission, you can attach the I-16 to the mothership the same way you attach gliders to planes – set up a flight of I-16s with one waypoint, and set the waypoint's target to the TB-3 (go to the Waypoint tab of the Object window with your I-16 selected, hit the Set button and click on the TB-3). The I-16 will be attached to the TB-3 in the beginning of the mission. You cannot build missions where I-16s start detached from the TB-3 and attach afterwards.
- AI flying these I-16s will automatically detach when the TB-3 approaches a GATTACK waypoint. The I-16s then will attack the site and return to escort the TB-3 back. You may use the "Aircraft Attach/Detach" button when flying these planes to detach from the TB-3, or drop the I-16s if you're flying the TB-3.
- In dogfight mode, you may attach your I-16 to the TB-3 mothership while on the airfield. To do so, taxi the plane to the attachment port under the TB-3's wing, and press the "Aircraft Attach/Detach" button. Your plane will be attached to the mothership and your landing gear will be raised automatically.
- Note that while attached to a TB-3, I-16s drain the mothership's fuel reserve, and if their engines are left at low RPM their fuel tanks will slowly refill to 100%.

In all other respects the TB-3 4M-34R *Pilot Notes* should be used.

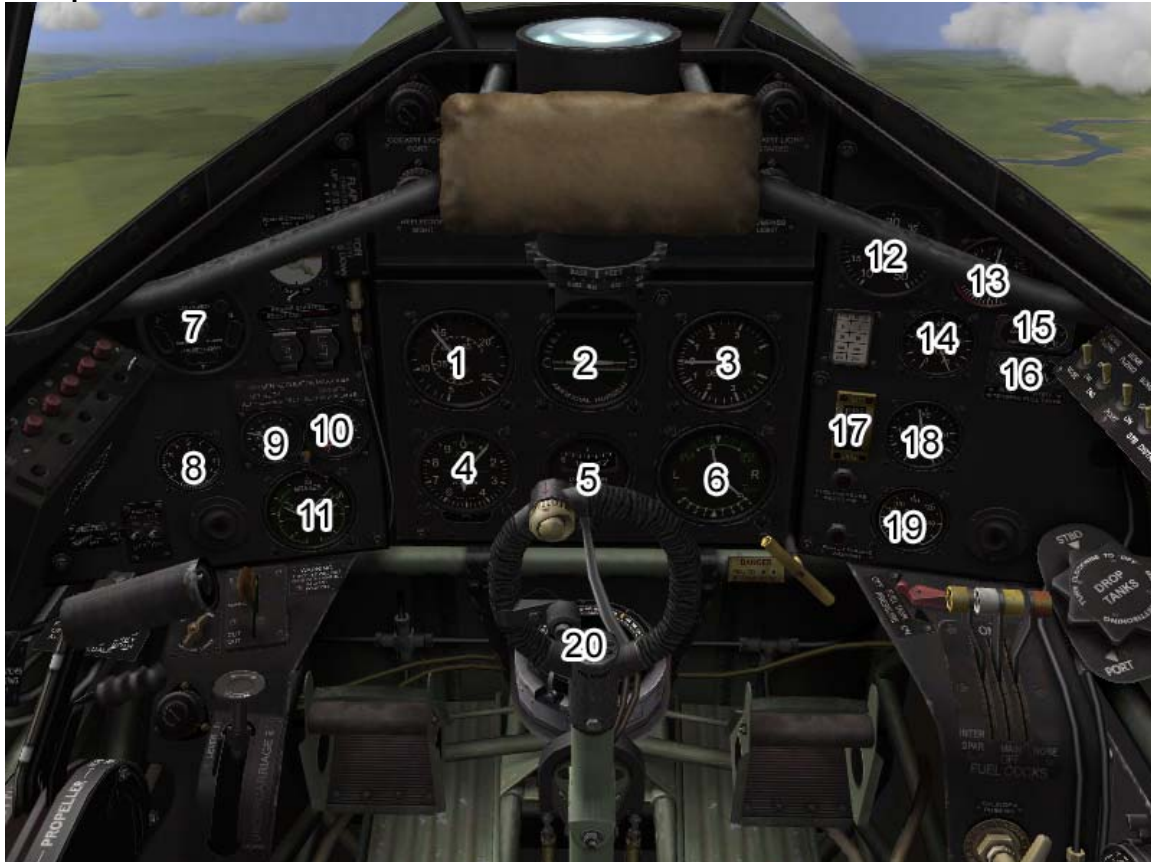
Tempest Mk V



Type: Fighter

Major Users: RAF

Cockpit Guide:



- | | | | |
|----|-------------------------------|----|---------------------------|
| 1 | Airspeed Indicator | 11 | Brake Pressure |
| 2 | Artificial Horizon | 12 | RPM Indicator |
| 3 | Variometer | 13 | Manifold Pressure |
| 4 | Altimeter | 14 | Fuel Level (Nose) |
| 5 | Compass | 15 | Fuel Level (Main) |
| 6 | Turn & Bank Indicator | 16 | Fuel Level (Wings) |
| 7 | Landing Gear Indicator Lights | 17 | Oil Pressure |
| 8 | Clock | 18 | Oil Temperature |
| 9 | Oxygen Altitude | 19 | Coolant Temperature |
| 10 | Oxygen Supply | 20 | Compass |

At a Glance:

Engine:

1 x IIB

Power: 2,400 HP

Armament:

- 4 x 20mm Mark II cannons
- 1,000 lb of bombs
- 8 x 3 in rockets

Yak-1



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 9 | Coolant Temperature |
| 2 | Compass | 10 | Voltmeter |
| 3 | Manifold Pressure | 11 | Magneto |
| 4 | Airspeed Indicator | 12 | Landing Gear Lever |
| 5 | Turn & Bank Indicator | 13 | Gun Heat Indicator |
| 6 | RPM Indicator | 14 | Ammeter |
| 7 | Clock | 15 | Landing Gear Indicator Lights |
| 8 | Oil Temp & Pressure; Fuel Pressure | | |

(Yak-1 continued)

At a Glance:

Engine:

M-105P

Power: 1,050 HP

Armament:

- 1 x 7.62mm MG (ShKAS)
- 1 x 20mm cannon (ShVAK)
- 6 x RS-82 rockets

Advantages:

- Excellent flight performance for 1940;
- Good maneuverability;
- Good armament;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Yak-1 is inferior to contemporary German fighters in the vertical and superior in horizontal combat. In capable hands it can win a fight against almost any opponent.
- The key to winning aerial combat with the Yak is to get the German fighter to slow down and commit to a turning fight or rolling scissors. These fights are Yak's strong point and Germans will usually lose. In vertical combat Yak can still fend for itself but a victory is much easier achieved in the horizontal.
Yak is a stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 3,000 meters. Worst performance above 4,000 meters

Yak-1B



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 9 | Coolant Temperature |
| 2 | Compass | 10 | Voltmeter |
| 3 | Manifold Pressure | 11 | Magneto |
| 4 | Airspeed Indicator | 12 | Landing Gear Lever |
| 5 | Turn & Bank Indicator | 13 | Gun Heat Indicator |
| 6 | RPM Indicator | 14 | Ammeter |
| 7 | Clock | 15 | Landing Gear Indicator Lights |
| 8 | Oil Temp & Pressure; Fuel Pressure | | |

(Yak-1 continued)

At a Glance:

Engine:

M-105PF

Power: 1,180 HP

Armament:

- 1 x 12.7mm MG (UBS)
- 1 x 20mm cannon (ShVAK)

Advantages:

- Excellent flight performance;
- Good cockpit visibility;
- Night flying possible without specialized equipment;
- Good maneuverability;
- Strong armament;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Yak-1 is inferior to contemporary German fighters in the vertical and superior in horizontal combat. In capable hands it can win a fight against almost any opponent.
- The key to winning aerial combat with the Yak is to get the German fighter to slow down and commit to a turning fight or rolling scissors. These fights are Yak's strong point and Germans will usually lose. In vertical combat Yak can still fend for itself but a victory is much easier achieved in the horizontal.
Yak is a stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 3,000 meters. Worst performance above 4,000 meters

Yak-7A



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---|----|--------------------------------------|
| 1 | <i>Altimeter</i> | 9 | <i>Coolant Temperature</i> |
| 2 | <i>Compass</i> | 10 | <i>Voltmeter</i> |
| 3 | <i>Manifold Pressure</i> | 11 | <i>Magnetos</i> |
| 4 | <i>Airspeed Indicator</i> | 12 | <i>Landing Gear Lever</i> |
| 5 | <i>Turn & Bank Indicator</i> | 13 | <i>Gun Heat Indicator</i> |
| 6 | <i>RPM Indicator</i> | 14 | <i>Ammeter</i> |
| 7 | <i>Clock</i> | 15 | <i>Landing Gear Indicator Lights</i> |
| 8 | <i>Oil Temp & Pressure; Fuel Pressure</i> | | |

(Yak-7 continued)

At a Glance:

Engine:

M-105P.

Power: 1,050 HP

Armament:

- 2 x 7.62 mm MG (ShKAS);
- 1 x 20 mm cannon (ShVAK).

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Yak-7 is inferior to contemporary German fighters in the vertical and superior in horizontal combat. In capable hands it can win a fight against almost any opponent.
- The key to winning aerial combat with the Yak is to get the German fighter to slow down and commit to a turning fight or rolling scissors. These fights are Yak's strong point and Germans will usually lose. In vertical combat Yak can still fend for itself but a victory is much easier achieved in the horizontal.
Yak is a stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 3,000 meters. Worst performance above 4,000 meters

Yak-7B 1941



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 9 | Coolant Temperature |
| 2 | Compass | 10 | Voltmeter |
| 3 | Manifold Pressure | 11 | Magneto |
| 4 | Airspeed Indicator | 12 | Landing Gear Lever |
| 5 | Turn & Bank Indicator | 13 | Gun Heat Indicator |
| 6 | RPM Indicator | 14 | Ammeter |
| 7 | Clock | 15 | Landing Gear Indicator Lights |
| 8 | Oil Temp & Pressure; Fuel Pressure | | |

(Yak-7 continued)

At a Glance:

Engine:

M-105P.

Power: 1,050 HP

Armament:

- 2 x 7.62 mm MG (ShKAS);
- 1 x 20 mm cannon (ShVAK).

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Yak-7 is inferior to contemporary German fighters in the vertical and superior in horizontal combat. In capable hands it can win a fight against almost any opponent.
- The key to winning aerial combat with the Yak is to get the German fighter to slow down and commit to a turning fight or rolling scissors. These fights are Yak's strong point and Germans will usually lose. In vertical combat Yak can still fend for itself but a victory is much easier achieved in the horizontal.
Yak is a stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 3,000 meters. Worst performance above 4,000 meters

Yak-7B 1942



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|-------------------------------|
| 1 | Altimeter | 9 | Coolant Temperature |
| 2 | Compass | 10 | Voltmeter |
| 3 | Manifold Pressure | 11 | Magneto |
| 4 | Airspeed Indicator | 12 | Landing Gear Lever |
| 5 | Turn & Bank Indicator | 13 | Gun Heat Indicator |
| 6 | RPM Indicator | 14 | Ammeter |
| 7 | Clock | 15 | Landing Gear Indicator Lights |
| 8 | Oil Temp & Pressure; Fuel Pressure | | |

(Yak-7 continued)

At a Glance:

Engine:

M-105P.

Power: 1,050 HP

Armament:

- 2 x 7.62 mm MG (ShKAS);
- 1 x 20 mm cannon (ShVAK).

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Yak-7 is inferior to contemporary German fighters in the vertical and superior in horizontal combat. In capable hands it can win a fight against almost any opponent.
- The key to winning aerial combat with the Yak is to get the German fighter to slow down and commit to a turning fight or rolling scissors. These fights are Yak's strong point and Germans will usually lose. In vertical combat Yak can still fend for itself but a victory is much easier achieved in the horizontal.
Yak is a stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 3,000 meters. Worst performance above 4,000 meters

Yak-9



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Altimeter | 9 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 10 | Oxygen Apparatus |
| 3 | Clock | 11 | Armament Status Lights |
| 4 | Airspeed Indicator | 12 | Landing Gear Indicator Lights |
| 5 | Turn & Bank Indicator | 13 | Coolant Temperature |
| 6 | Variometer | 14 | Voltmeter |
| 7 | Manifold Pressure | 15 | Radio |
| 8 | RPM Indicator | | |

(Yak-9 continued)

At a Glance:

Engine:

M-105PF

Power: 1,180 HP

Armament:

- 1 x 7.62mm MG (ShKAS)
- 1 x 20mm cannon (ShVAK)

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- 1943 and later Yak fighters are excellent dogfighters with great all-around performance. Can be used both as an energy or angles fighter against BF-109s up to G6, and all FW-190A and F. Best used as angles fighter against later 109s, FW-190D and Me-262.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-9B



Type: Fighter-Bomber

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Altimeter | 9 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 10 | Oxygen Apparatus |
| 3 | Clock | 11 | Armament Status Lights |
| 4 | Airspeed Indicator | 12 | Landing Gear Indicator Lights |
| 5 | Turn & Bank Indicator | 13 | Coolant Temperature |
| 6 | Variometer | 14 | Voltmeter |
| 7 | Manifold Pressure | 15 | Radio |
| 8 | RPM Indicator | | |

(Yak-9 continued)

At a Glance:

Engine:

VK-105PF

Power: 1,180 HP

Armament:

- 1 x 12.7mm MG (UBS)
- 1 x 20mm cannon (ShVAK)
- Up to 400 kg of bombs

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- 1943 and later Yak fighters are excellent dogfighters with great all-around performance. Can be used both as an energy or angles fighter against BF-109s up to G6, and all FW-190A and F. Best used as angles fighter against later 109s, FW-190D and Me-262.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-9D



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Altimeter | 9 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 10 | Oxygen Apparatus |
| 3 | Clock | 11 | Armament Status Lights |
| 4 | Airspeed Indicator | 12 | Landing Gear Indicator Lights |
| 5 | Turn & Bank Indicator | 13 | Coolant Temperature |
| 6 | Variometer | 14 | Voltmeter |
| 7 | Manifold Pressure | 15 | Radio |
| 8 | RPM Indicator | | |

(Yak-9 continued)

At a Glance:

Engine:

M-105PF

Power: 1,180 HP

Armament:

- 1 x 12.7mm MG (UBS)
- 1 x 20mm cannon (ShVAK)

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- 1943 and later Yak fighters are excellent dogfighters with great all-around performance. Can be used both as an energy or angles fighter against BF-109s up to G6, and all FW-190A and F. Best used as angles fighter against later 109s, FW-190D and Me-262.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-9K



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Altimeter | 9 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 10 | Oxygen Apparatus |
| 3 | Clock | 11 | Armament Status Lights |
| 4 | Airspeed Indicator | 12 | Landing Gear Indicator Lights |
| 5 | Turn & Bank Indicator | 13 | Coolant Temperature |
| 6 | Variometer | 14 | Voltmeter |
| 7 | Manifold Pressure | 15 | Radio |
| 8 | RPM Indicator | | |

(Yak-9 continued)

At a Glance:

Engine:

VK-105PF.

Power: 1,180 HP

Armament:

- 1 x 12.7 mm MG (UBS);
- 1 x 45 mm cannon (NS).

Advantages:

- Excellent performance characteristics;
- Good maneuverability.
- Devastating armament;
- Very durable;
- Easy to fly.

Disadvantages:

- Heavy recoil makes for a very unstable gun platform.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- This is an experimental anti-tank version of the Yak-9. The 45mm cannon was mostly intended to pierce the thin top armor of enemy tanks. However it can be more than adequate against enemy aircraft, as long as the first round fired is sure to hit its target.
- For aerial hawk-eyes, the 45mm cannon is effective at ranges over 1 km.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-9M



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Altimeter | 9 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 10 | Oxygen Apparatus |
| 3 | Clock | 11 | Armament Status Lights |
| 4 | Airspeed Indicator | 12 | Landing Gear Indicator Lights |
| 5 | Turn & Bank Indicator | 13 | Coolant Temperature |
| 6 | Variometer | 14 | Voltmeter |
| 7 | Manifold Pressure | 15 | Radio |
| 8 | RPM Indicator | | |

(Yak-9 continued)

At a Glance:

Engine:

VK-105PF

Power: 1,180 HP

Armament:

- 1 x 12.7mm MG (UBS)
- 1 x 20mm cannon (ShVAK)

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- 1943 and later Yak fighters are excellent dogfighters with great all-around performance. Can be used both as an energy or angles fighter against BF-109s up to G6, and all FW-190A and F. Best used as angles fighter against later 109s, FW-190D and Me-262.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-9T



Type: Fighter-Bomber

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|----------------------------------|----|---|
| 1 | <i>Altimeter</i> | 9 | <i>Oil Temp & Pressure; Fuel Pressure</i> |
| 2 | <i>Compass</i> | 10 | <i>Oxygen Apparatus</i> |
| 3 | <i>Clock</i> | 11 | <i>Armament Status Lights</i> |
| 4 | <i>Airspeed Indicator</i> | 12 | <i>Landing Gear Indicator Lights</i> |
| 5 | <i>Turn & Bank Indicator</i> | 13 | <i>Coolant Temperature</i> |
| 6 | <i>Variometer</i> | 14 | <i>Voltmeter</i> |
| 7 | <i>Manifold Pressure</i> | 15 | <i>Radio</i> |
| 8 | <i>RPM Indicator</i> | | |

(Yak-9 continued)

At a Glance:

Engine:

VK-105PF

Power: 1,180 HP

Armament:

- 1 x 12.7mm MG (UBS)
- 1 x 37mm cannon (NS-37)

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- The heavy 37mm cannon was mostly intended to be used against ground targets. However it can also be used against enemy aircraft.
- For aerial hawk-eyes, the 37mm cannon is effective at ranges up to 1 km.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-9U



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Altimeter | 9 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 10 | Oxygen Apparatus |
| 3 | Clock | 11 | Magneto |
| 4 | Airspeed Indicator | 12 | Landing Gear Lever |
| 5 | Turn & Bank Indicator | 13 | Coolant Temperature |
| 6 | Variometer | 14 | Internal System Indicator |
| 7 | Manifold Pressure | 15 | Coolant Temperature |
| 8 | RPM Indicator | | |

(Yak-9 continued)

At a Glance:

Engine:

VK-107A.

Power: 1,500 HP

Armament:

- 2 x 12.7 mm MG (UBS);
- 1 x 20 mm cannon (ShVAK).

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- 1943 and later Yak fighters are excellent dogfighters with great all-around performance. Can be used both as an energy or angles fighter against BF-109s up to G6, and all FW-190A and F. Best used as angles fighter against later 109s, FW-190D and Me-262.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-9UT



Type: Fighter-Bomber

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Altimeter | 9 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 10 | Oxygen Apparatus |
| 3 | Clock | 11 | Magneto |
| 4 | Airspeed Indicator | 12 | Landing Gear Lever |
| 5 | Turn & Bank Indicator | 13 | Coolant Temperature |
| 6 | Variometer | 14 | Internal System Indicator |
| 7 | Manifold Pressure | 15 | Coolant Temperature |
| 8 | RPM Indicator | | |

(Yak-9 continued)

At a Glance:

Engine:

VK-107A

Power: 1,180 HP

Armament:

- 2 x 20mm cannon (B-20S)
- 1 x 37mm cannon (NS-37)

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- The heavy 20mm and 37mm armament was mostly intended to be used against ground targets. However it can also be used against enemy aircraft.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-3



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Altimeter | 9 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 10 | Oxygen Apparatus |
| 3 | Clock | 11 | Magneto |
| 4 | Airspeed Indicator | 12 | Landing Gear Lever |
| 5 | Turn & Bank Indicator | 13 | Coolant Temperature |
| 6 | Variometer | 14 | Internal System Indicator |
| 7 | Manifold Pressure | 15 | Coolant Temperature |
| 8 | RPM Indicator | | |

(Yak-3 continued)

At a Glance:

Engine:

VK-105PF2

Power: 1,240 HP

Armament:

- 2 x 12.7 mm MG (UBS);
- 1 x 20 mm cannon (ShVAK).

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Increased aircraft durability;
- Easy to fly.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Excellent all-around dogfighter.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-3 VK-107



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Altimeter | 9 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 10 | Oxygen Apparatus |
| 3 | Clock | 11 | Magneto |
| 4 | Airspeed Indicator | 12 | Landing Gear Lever |
| 5 | Turn & Bank Indicator | 13 | Coolant Temperature |
| 6 | Variometer | 14 | Internal System Indicator |
| 7 | Manifold Pressure | 15 | Coolant Temperature |
| 8 | RPM Indicator | | |

(Yak-3 continued)

At a Glance:

Engine:

1 x VK-107A

Power: 1,500 at sea level

Armament:

- 2 x 20mm B-20S cannon (120 shells each)

Advantages:

- Excellent maneuverability;
- Small size;
- Strong armament.

Disadvantages:

- Light-weight construction buckling under high Gs.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Excellent all-around dogfighter.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-3P



Type: Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Altimeter | 9 | Oil Temp & Pressure; Fuel Pressure |
| 2 | Compass | 10 | Oxygen Apparatus |
| 3 | Clock | 11 | Magneto |
| 4 | Airspeed Indicator | 12 | Landing Gear Lever |
| 5 | Turn & Bank Indicator | 13 | Coolant Temperature |
| 6 | Variometer | 14 | Internal System Indicator |
| 7 | Manifold Pressure | 15 | Coolant Temperature |
| 8 | RPM Indicator | | |

(Yak-3 continued)

At a Glance:

Engine:

1 x VK-105PF

Power: 1,240 HP

Armament:

- 2 x 20mm cannon (B-20S)
- 1 x 20mm cannon (B-20M)

Advantages:

- Excellent maneuverability;
- Small size;
- Strong armament.

Disadvantages:

- Defects and imperfections during large-scale production.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,800 RPM

Best Cruise: 2,300 RPM

Economy Cruise: 2,150 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Excellent all-around dogfighter.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-3R



Type: Mixed Power Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|------------------------------------|----|-------------------------------------|
| 1 | Altimeter | 10 | Oxygen Apparatus |
| 2 | Compass | 11 | Magneto |
| 3 | Clock | 12 | Landing Gear Lever |
| 4 | Airspeed Indicator | 13 | Coolant Temperature |
| 5 | Turn & Bank Indicator | 14 | Internal System Indicator |
| 6 | Variometer | 15 | Coolant Temperature |
| 7 | Manifold Pressure | 16 | Fuel Level (Rocket Engine) |
| 8 | RPM Indicator | 17 | Fuel Level (Rocket Engine) |
| 9 | Oil Temp & Pressure; Fuel Pressure | 18 | Exhaust Temperature (Rocket Engine) |

(Yak-3R continued)

At a Glance:

Engine:

- 1 x VK-105PD
- 1 X GlushkoRD-1

Power: 1,240 HP

300 kg/s at sea level

Armament:

- 1 x 23mm NS-23 cannon

Advantages:

- Excellent maneuverability;
- Excellent top speed.

Disadvantages:

- Insufficient time of flight with the rocket engine;
- Loss of speed under piston power alone;
- Weak armament.

Pilot Notes:

- Excellent fighter with great all-around performance, especially in energy tactics. Outstanding climb, acceleration and diving characteristics. Slightly inferior to the Yak-3 in maneuvering fights due to increased weight.
- The rocket engine has limited throttle control. The piston engine operation is the same as on the regular Yak-3.
- Very stable gun platform. Best results can be achieved at ranges under 200 meters by aiming at enemy engine and/or cockpit area.
- Yak will not easily stall at slow speeds and will usually not enter a high-speed stall unless flown improperly.
- Supercharger speeds need to be switched at around 2,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Yak-15



Type: Jet Fighter

Major Users: USSR

Cockpit Guide:



- | | | | |
|---|---------------------------|----|-------------------------------|
| 1 | Altimeter | 10 | Air Pressure |
| 2 | Compass | 11 | Exhaust Pressure |
| 3 | Clock | 12 | RPM Indicator |
| 4 | Airspeed Indicator | 13 | Fuel Level |
| 5 | Turn & Bank Indicator | 14 | Fuel Pressure |
| 6 | Variometer | 15 | Oil Pressure |
| 7 | Oxygen Supply | 16 | Exhaust Temperature |
| 8 | Oxygen Flow Indicator | 17 | Emergency Air Pressure |
| 9 | Ammeter | 18 | Landing Gear Indicator Lights |

(Yak-15 continued)

At a Glance:

Engine:

1 x RD-10 turbojet

Power: 900 kg / s

Armament:

- 2 x 23mm NS-23 cannon

Advantages:

- Ease of conversion from piston to jet engines;
- Good maneuverability.

Disadvantages:

- Manufacturing defects;
- Extremely short range.

Pilot Notes:

- The Yak is the lightest production jet fighter in entire history of aerial warfare. Correspondingly, it's maneuverable and can climb and accelerate very well, but its dive performance is poor.
- Please note that the Soviet variant of the German engine used for the Yak-15 was not a 1-for-1 copy of the venerable German design. Several modifications were made, most importantly the use of advanced alloys which were unavailable in late-war Germany. This greatly increased the reliability and service life of the engine. Therefore, engine temperature was much less of a problem with the Yak-15 than with the comparable jets.

YP-80



Type: Jet Fighter

Major Users: USA

Cockpit Guide:



- | | | | |
|----|---------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 13 | Oxygen Cylinder Pressure |
| 2 | Compass | 14 | Clock |
| 3 | Artificial Horizon | 15 | Fuel Level |
| 4 | RPM Indicator | 16 | Bearing Temperature |
| 5 | Altimeter | 17 | Oil Pressure |
| 6 | Turn & Bank Indicator | 18 | Accelerometer |
| 7 | Variometer | 19 | Gauge Pressure |
| 8 | Compass | 20 | Landing Gear Indicator Lights |
| 9 | Fuel Pressure | 21 | Fuel Level Warning Light |
| 10 | Exhaust Temperature | 22 | Stall Warning Light |
| 11 | Ammeter | 23 | Engine Fire Warning Light |
| 12 | Oxygen Flow Indicator | | |

(YP-80 continued)

At a Glance:

Engine:

1 x J-33-GE-11

Thrust: 1,748 kgx

Armament:

- 6 x .50 cal M2 machine guns

Advantages:

- High speed for its time;
- More maneuverable than most comparable jet fighters of the time.

Disadvantages:

- Unreliable engine

A6M2



Type: Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|------------------------------|----|---------------------------|
| 1 | Artificial Horizon | 11 | Altimeter |
| 2 | Turn & Bank Indicator | 12 | Cylinder Head Temperature |
| 3 | Clock | 13 | Oil Temperature |
| 4 | Airspeed Indicator | 14 | Manifold Pressure |
| 5 | Compass | 15 | Oxygen Quantity |
| 6 | Variometer | 16 | Oxygen Pressure |
| 7 | Fuel Pressure & Oil Pressure | 17 | Fuel Level (Wing) |
| 8 | RPM Indicator | 18 | Fuel Level (Fuselage) |
| 9 | Compass | 19 | Internal System Indicator |
| 10 | Magnetos | | |

(A6M continued)

At a Glance:

Engine:

NK1C Sakae-12

Power:

Take-off: 940 HP

Indicated: 950 HP at 5,000 m

Armament:

- 2 x 7,7-mm Type 97 machine guns
- 2 x 20-mm Type 99 wing cannons
- 2 x 60 kg bombs

Advantages:

- Speed, maneuverability and range undreamed of by other contemporary carrier borne fighters;
- Good cockpit visibility.

Disadvantages:

- Poor pilot protection;
- No self-sealing fuel tanks

Pilot Notes:

- Switch supercharger speeds at 3,300 meters (10,800 feet)
- **Wing Fold:** This key will toggle your carrier-borne aircraft's wings between the up and down position. Not all aircraft are so equipped. None of the land-based aircraft have this feature, and many carrier-borne planes, such as the SBD Dauntless or the F4F-3 were also not historically equipped with folding wings.
We do not recommend using this feature while airborne.
That doesn't mean you shouldn't try it once. Or twice.
- **Change seat position:** this key toggles the pilot's seat height between two presets: high and low. This feature is intended for use during take-offs and landing to help look over the aircraft's nose. High position should not be used in combat as it prevents you from using your gunsight. You must open your canopy first before raising your seat.
This function ONLY works on the A6M Zero, F4U Corsairs and F4F/FM Wildcat series of planes. All other planes did not have seat systems that could be controlled by pilot in-flight.
- **Arrestor Hook:** toggles your aircraft arresting hook between the up and down positions. Used to land on an aircraft carrier.
NOTE: not all planes are equipped with the arrestor hook.
- **Chocks:** These are used to fix your aircraft on the carrier deck, and to reach full throttle before beginning to move. Otherwise a heavy aircraft, especially carrying extra fuel or ordnance, may not be able to reach sufficient speed if it begins moving before reaching max RPM. This is especially true for slow moving or stationary carriers, as their speed is added to your plane's speed during take-off. In other words, an aircraft carrier moving at 20 miles per hour adds 20 mph to your airspeed even when you remain stationary with your engine off. If the carrier however is not moving, it means you need to reach an even higher speed before you run out of deck.
You're not required to use chocks, and can release them at any time and simply use wheel brakes, however chocks provide much better control over your aircraft's speed when you increase RPM.
After landing on a carrier, if you wish to watch other AI or human-controlled planes land, move to the front of the ship and engage chocks. Otherwise the motion of the ocean may cause your plane to slide and fall overboard.

A6M2-21



Type: Carrier-Borne Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|---|----|----------------------------------|
| 1 | <i>Artificial Horizon</i> | 11 | Altimeter |
| 2 | <i>Turn & Bank Indicator</i> | 12 | <i>Cylinder Head Temperature</i> |
| 3 | <i>Clock</i> | 13 | <i>Oil Temperature</i> |
| 4 | Airspeed Indicator | 14 | <i>Manifold Pressure</i> |
| 5 | Compass | 15 | <i>Oxygen Quantity</i> |
| 6 | <i>Variometer</i> | 16 | <i>Oxygen Pressure</i> |
| 7 | <i>Fuel Pressure & Oil Pressure</i> | 17 | Fuel Level (Wing) |
| 8 | <i>RPM Indicator</i> | 18 | Fuel Level (Fuselage) |
| 9 | Compass | 19 | <i>Internal System Indicator</i> |
| 10 | <i>Magnetos</i> | | |

(A6M continued)

At a Glance:

Engine:

NK1C Sakae-12

Power:

Take-off: 940 HP

Indicated: 950 HP at 5,000 m

Armament:

- 2 x 7,7-mm Type 97 machine guns
- 2 x 20-mm Type 99 wing cannons
- 2 x 60 kg bombs

Advantages:

- Speed, maneuverability and range undreamed of by other contemporary carrier borne fighters;
- Good cockpit visibility.

Disadvantages:

- Poor pilot protection;
- No self-sealing fuel tanks

Pilot Notes:

- Switch supercharger speeds at 3,300 meters (10,800 feet)
- **Wing Fold:** This key will toggle your carrier-borne aircraft's wings between the up and down position. Not all aircraft are so equipped. None of the land-based aircraft have this feature, and many carrier-borne planes, such as the SBD Dauntless or the F4F-3 were also not historically equipped with folding wings.
We do not recommend using this feature while airborne.
That doesn't mean you shouldn't try it once. Or twice.
- **Change seat position:** this key toggles the pilot's seat height between two presets: high and low. This feature is intended for use during take-offs and landing to help look over the aircraft's nose. High position should not be used in combat as it prevents you from using your gunsight. You must open your canopy first before raising your seat.
This function ONLY works on the A6M Zero, F4U Corsairs and F4F/FM Wildcat series of planes. All other planes did not have seat systems that could be controlled by pilot in-flight.
- **Arrestor Hook:** toggles your aircraft arresting hook between the up and down positions. Used to land on an aircraft carrier.
NOTE: not all planes are equipped with the arrestor hook.
- **Chocks:** These are used to fix your aircraft on the carrier deck, and to reach full throttle before beginning to move. Otherwise a heavy aircraft, especially carrying extra fuel or ordnance, may not be able to reach sufficient speed if it begins moving before reaching max RPM. This is especially true for slow moving or stationary carriers, as their speed is added to your plane's speed during take-off. In other words, an aircraft carrier moving at 20 miles per hour adds 20 mph to your airspeed even when you remain stationary with your engine off. If the carrier however is not moving, it means you need to reach an even higher speed before you run out of deck.
You're not required to use chocks, and can release them at any time and simply use wheel brakes, however chocks provide much better control over your aircraft's speed when you increase RPM.
After landing on a carrier, if you wish to watch other AI or human-controlled planes land, move to the front of the ship and engage chocks. Otherwise the motion of the ocean may cause your plane to slide and fall overboard.

A6M2-N



Type: Floatplane Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|------------------------------|----|------------------------------|
| 1 | Artificial Horizon | 11 | Altimeter |
| 2 | Turn & Bank Indicator | 12 | Cylinder Head Temperature |
| 3 | Clock | 13 | Oil Temperature |
| 4 | Airspeed Indicator | 14 | Manifold Pressure |
| 5 | Compass | 15 | Oxygen Quantity |
| 6 | Variometer | 16 | Oxygen Pressure |
| 7 | Fuel Pressure & Oil Pressure | 17 | Fuel Level (Wing) |
| 8 | RPM Indicator | 18 | Fuel Level (Fuselage) |
| 9 | Compass | 19 | Internal System Indicator |
| 10 | Magnetos | | |

(A6M continued)

At a Glance:

Engine:

1 x Sakae 12

Power: 940 HP

Armament:

- 2 x Type 87 7.7mm machine guns (fuselage)
- 2 x Type 99 20mm cannon (wing)
- 2 x 60kg bombs

Advantages:

- Speed, maneuverability and range undreamed of by other contemporary floatplane fighters;
- Good cockpit visibility.

Disadvantages:

- Poor pilot protection;
- No self-sealing fuel tanks;
- Performance inferior to that of the retractable wing A6M2.

Pilot Notes:

- A6M2-N is one of the very few floatplanes modeled in our sim, and it is unique in being the only flyable one.
- The A6M2-N cannot safely operate on land-based runways.
- Many Pacific maps, and a few European ones, have water runways created specifically for floatplanes.
- Landing and taking off on water is not much different from landing on a runway, as we do not model waves and water swells. You must mainly ensure to do a shallow flare and land on the entire surface of the float.
- Switch supercharger speeds at 3,300 meters (10,800 feet)

A6M3



Type: Fighter

Major Users: Japan

Cockpit Guide:



- 1 Artificial Horizon
- 2 Turn & Bank Indicator
- 3 Clock
- 4 **Airspeed Indicator**
- 5 **Compass**
- 6 Variometer
- 7 Fuel Pressure & Oil Pressure
- 8 RPM Indicator
- 9 **Compass**
- 10 Magnetos

- 11 **Altimeter**
- 12 Cylinder Head Temperature
- 13 Oil Temperature
- 14 Manifold Pressure
- 15 Oxygen Quantity
- 16 Oxygen Pressure
- 17 **Fuel Level (Wing)**
- 18 **Fuel Level (Fuselage)**
- 19 Internal System Indicator

(A6M continued)

At a Glance:

Engine:

NK1C Sakae-12

Power: 1,130 HP

Armament:

- 2 x 7,7-mm Type 97 machine guns
- 2 x 20-mm Type 99 wing cannons
- 2 x 60 kg bombs

Advantages:

- Speed, maneuverability and range undreamed of by other contemporary carrier borne fighters;
- Good cockpit visibility.

Disadvantages:

- Poor pilot protection;
- No self-sealing fuel tanks

Pilot Notes:

- Switch supercharger speeds at 3,300 meters (10,800 feet)
- **Wing Fold:** This key will toggle your carrier-borne aircraft's wings between the up and down position. Not all aircraft are so equipped. None of the land-based aircraft have this feature, and many carrier-borne planes, such as the SBD Dauntless or the F4F-3 were also not historically equipped with folding wings.
We do not recommend using this feature while airborne.
That doesn't mean you shouldn't try it once. Or twice.
- **Change seat position:** this key toggles the pilot's seat height between two presets: high and low. This feature is intended for use during take-offs and landing to help look over the aircraft's nose. High position should not be used in combat as it prevents you from using your gunsight. You must open your canopy first before raising your seat.
This function ONLY works on the A6M Zero, F4U Corsairs and F4F/FM Wildcat series of planes. All other planes did not have seat systems that could be controlled by pilot in-flight.
- **Arrestor Hook:** toggles your aircraft arresting hook between the up and down positions. Used to land on an aircraft carrier.
NOTE: not all planes are equipped with the arrestor hook.
- **Chocks:** These are used to fix your aircraft on the carrier deck, and to reach full throttle before beginning to move. Otherwise a heavy aircraft, especially carrying extra fuel or ordnance, may not be able to reach sufficient speed if it begins moving before reaching max RPM. This is especially true for slow moving or stationary carriers, as their speed is added to your plane's speed during take-off. In other words, an aircraft carrier moving at 20 miles per hour adds 20 mph to your airspeed even when you remain stationary with your engine off. If the carrier however is not moving, it means you need to reach an even higher speed before you run out of deck.
You're not required to use chocks, and can release them at any time and simply use wheel brakes, however chocks provide much better control over your aircraft's speed when you increase RPM.
After landing on a carrier, if you wish to watch other AI or human-controlled planes land, move to the front of the ship and engage chocks. Otherwise the motion of the ocean may cause your plane to slide and fall overboard.

A6M5



Type: Carrier-Borne Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|------------------------------|----|------------------------------|
| 1 | Artificial Horizon | 11 | Magnetos |
| 2 | Turn & Bank Indicator | 12 | Altimeter |
| 3 | Mixture Indicator | 13 | Cylinder Head Temperature |
| 4 | Clock | 14 | Oil Temperature |
| 5 | Airspeed Indicator | 15 | Manifold Pressure |
| 6 | Compass | 16 | Oxygen Quantity |
| 7 | Variometer | 17 | Oxygen Pressure |
| 8 | Fuel Pressure & Oil Pressure | 18 | Fuel Level (Wing) |
| 9 | RPM Indicator | 19 | Fuel Level (Fuselage) |
| 10 | Compass | 20 | Internal System Indicator |

(A6M continued)

At a Glance:

Engine:

1 x NK1F Sakae-21

Power:

Take-off: 1,130 HP

Indicated: 1,100 HP at 3,500 m

Armament:

- 2 x 7,7-mm Type 97 machine guns
- 2 x 20-mm Type 99 wing cannons
- 2 x 60 kg bombs

Advantages:

- Good maneuverability;
- Good pilot visibility.

Disadvantages:

- Weak armor;
- No self-sealing tanks;
- Low top speed.

Pilot Notes:

- Switch supercharger speeds at 3,300 meters (10,800 feet)
- **Wing Fold:** This key will toggle your carrier-borne aircraft's wings between the up and down position. Not all aircraft are so equipped. None of the land-based aircraft have this feature, and many carrier-borne planes, such as the SBD Dauntless or the F4F-3 were also not historically equipped with folding wings.
We do not recommend using this feature while airborne.
That doesn't mean you shouldn't try it once. Or twice.
- **Change seat position:** this key toggles the pilot's seat height between two presets: high and low. This feature is intended for use during take-offs and landing to help look over the aircraft's nose. High position should not be used in combat as it prevents you from using your gunsight. You must open your canopy first before raising your seat.
This function ONLY works on the A6M Zero, F4U Corsairs and F4F/FM Wildcat series of planes. All other planes did not have seat systems that could be controlled by pilot in-flight.
- **Arrestor Hook:** toggles your aircraft arresting hook between the up and down positions. Used to land on an aircraft carrier.
NOTE: not all planes are equipped with the arrestor hook.
- **Chocks:** These are used to fix your aircraft on the carrier deck, and to reach full throttle before beginning to move. Otherwise a heavy aircraft, especially carrying extra fuel or ordnance, may not be able to reach sufficient speed if it begins moving before reaching max RPM. This is especially true for slow moving or stationary carriers, as their speed is added to your plane's speed during take-off. In other words, an aircraft carrier moving at 20 miles per hour adds 20 mph to your airspeed even when you remain stationary with your engine off. If the carrier however is not moving, it means you need to reach an even higher speed before you run out of deck.
You're not required to use chocks, and can release them at any time and simply use wheel brakes, however chocks provide much better control over your aircraft's speed when you increase RPM.
After landing on a carrier, if you wish to watch other AI or human-controlled planes land, move to the front of the ship and engage chocks. Otherwise the motion of the ocean may cause your plane to slide and fall overboard.

A6M5a



Type: Carrier-Borne Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|------------------------------|----|------------------------------|
| 1 | Artificial Horizon | 11 | Magnetos |
| 2 | Turn & Bank Indicator | 12 | Altimeter |
| 3 | Mixture Indicator | 13 | Cylinder Head Temperature |
| 4 | Clock | 14 | Oil Temperature |
| 5 | Airspeed Indicator | 15 | Manifold Pressure |
| 6 | Compass | 16 | Oxygen Quantity |
| 7 | Variometer | 17 | Oxygen Pressure |
| 8 | Fuel Pressure & Oil Pressure | 18 | Fuel Level (Wing) |
| 9 | RPM Indicator | 19 | Fuel Level (Fuselage) |
| 10 | Compass | 20 | Internal System Indicator |

(A6M continued)

At a Glance:

Engine:

1 x NK1F Sakae-21

Power:

Take-off: 1,130 HP

Indicated: 1,100 HP at 3,500 m

Armament:

- 1 x 13,2-mm machine gun
- 2 x 20-mm Type 99 wing cannons
- 2 x 60 kg bombs

Advantages:

- Good maneuverability;
- Good pilot visibility.

Disadvantages:

- Weak armor;
- Weak armament;
- No self-sealing tanks;
- Low top speed.

Pilot Notes:

- Switch supercharger speeds at 3,300 meters (10,800 feet)
- **Wing Fold:** This key will toggle your carrier-borne aircraft's wings between the up and down position. Not all aircraft are so equipped. None of the land-based aircraft have this feature, and many carrier-borne planes, such as the SBD Dauntless or the F4F-3 were also not historically equipped with folding wings.
We do not recommend using this feature while airborne.
That doesn't mean you shouldn't try it once. Or twice.
- **Change seat position:** this key toggles the pilot's seat height between two presets: high and low. This feature is intended for use during take-offs and landing to help look over the aircraft's nose. High position should not be used in combat as it prevents you from using your gunsight. You must open your canopy first before raising your seat.
This function ONLY works on the A6M Zero, F4U Corsairs and F4F/FM Wildcat series of planes. All other planes did not have seat systems that could be controlled by pilot in-flight.
- **Arrestor Hook:** toggles your aircraft arresting hook between the up and down positions. Used to land on an aircraft carrier.
NOTE: not all planes are equipped with the arrestor hook.
- **Chocks:** These are used to fix your aircraft on the carrier deck, and to reach full throttle before beginning to move. Otherwise a heavy aircraft, especially carrying extra fuel or ordnance, may not be able to reach sufficient speed if it begins moving before reaching max RPM. This is especially true for slow moving or stationary carriers, as their speed is added to your plane's speed during take-off. In other words, an aircraft carrier moving at 20 miles per hour adds 20 mph to your airspeed even when you remain stationary with your engine off. If the carrier however is not moving, it means you need to reach an even higher speed before you run out of deck.
You're not required to use chocks, and can release them at any time and simply use wheel brakes, however chocks provide much better control over your aircraft's speed when you increase RPM.
After landing on a carrier, if you wish to watch other AI or human-controlled planes land, move to the front of the ship and engage chocks. Otherwise the motion of the ocean may cause your plane to slide and fall overboard.

A6M5b



Type: Carrier-Borne Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|------------------------------|----|------------------------------|
| 1 | Artificial Horizon | 11 | Magnetos |
| 2 | Turn & Bank Indicator | 12 | Altimeter |
| 3 | Mixture Indicator | 13 | Cylinder Head Temperature |
| 4 | Clock | 14 | Oil Temperature |
| 5 | Airspeed Indicator | 15 | Manifold Pressure |
| 6 | Compass | 16 | Oxygen Quantity |
| 7 | Variometer | 17 | Oxygen Pressure |
| 8 | Fuel Pressure & Oil Pressure | 18 | Fuel Level (Wing) |
| 9 | RPM Indicator | 19 | Fuel Level (Fuselage) |
| 10 | Compass | 20 | Internal System Indicator |

(A6M continued)

At a Glance:

Engine:

1 x NK1F Sakae-21

Power:

Take-off: 1,130 HP

Indicated: 1,100 HP at 3,500 m

Armament:

- 1 x 13,2-mm machine gun
- 2 x 20-mm Type 99 wing cannons
- 2 x 60 kg bombs

Advantages:

- Good maneuverability;
- Good pilot visibility.

Disadvantages:

- Low damage threshold;
- Weak armament;
- Low top speed.

Pilot Notes:

- Switch supercharger speeds at 3,300 meters (10,800 feet)
- **Wing Fold:** This key will toggle your carrier-borne aircraft's wings between the up and down position. Not all aircraft are so equipped. None of the land-based aircraft have this feature, and many carrier-borne planes, such as the SBD Dauntless or the F4F-3 were also not historically equipped with folding wings.
We do not recommend using this feature while airborne.
That doesn't mean you shouldn't try it once. Or twice.
- **Change seat position:** this key toggles the pilot's seat height between two presets: high and low. This feature is intended for use during take-offs and landing to help look over the aircraft's nose. High position should not be used in combat as it prevents you from using your gunsight. You must open your canopy first before raising your seat.
This function ONLY works on the A6M Zero, F4U Corsairs and F4F/FM Wildcat series of planes. All other planes did not have seat systems that could be controlled by pilot in-flight.
- **Arrestor Hook:** toggles your aircraft arresting hook between the up and down positions. Used to land on an aircraft carrier.
NOTE: not all planes are equipped with the arrestor hook.
- **Chocks:** These are used to fix your aircraft on the carrier deck, and to reach full throttle before beginning to move. Otherwise a heavy aircraft, especially carrying extra fuel or ordnance, may not be able to reach sufficient speed if it begins moving before reaching max RPM. This is especially true for slow moving or stationary carriers, as their speed is added to your plane's speed during take-off. In other words, an aircraft carrier moving at 20 miles per hour adds 20 mph to your airspeed even when you remain stationary with your engine off. If the carrier however is not moving, it means you need to reach an even higher speed before you run out of deck.
You're not required to use chocks, and can release them at any time and simply use wheel brakes, however chocks provide much better control over your aircraft's speed when you increase RPM.
After landing on a carrier, if you wish to watch other AI or human-controlled planes land, move to the front of the ship and engage chocks. Otherwise the motion of the ocean may cause your plane to slide and fall overboard.

A6M5c



Type: Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|---|----|----------------------------------|
| 1 | <i>Artificial Horizon</i> | 12 | Altimeter |
| 2 | <i>Turn & Bank Indicator</i> | 13 | <i>Cylinder Head Temperature</i> |
| 3 | <i>Mixture Indicator</i> | 14 | <i>Oil Temperature</i> |
| 4 | <i>Clock</i> | 15 | <i>Manifold Pressure</i> |
| 5 | Airspeed Indicator | 16 | <i>Oxygen Quantity</i> |
| 6 | Compass | 17 | <i>Oxygen Pressure</i> |
| 7 | <i>Variometer</i> | 18 | Fuel Level (Wing) |
| 8 | <i>Fuel Pressure & Oil Pressure</i> | 19 | Fuel Level (Fuselage) |
| 9 | <i>RPM Indicator</i> | 20 | <i>Internal System Indicator</i> |
| 10 | Compass | 21 | <i>Mixture Indicator</i> |
| 11 | <i>Magnetos</i> | | |

(A6M continued)

At a Glance:

Engine:

1 x NK1F Sakae-21

Power:

Take-off: 1,130 HP

Indicated: 1,100 HP at 3,500 m

Armament:

- 1 x 13,2-mm machine gun
- 2 x 20-mm Type 99 wing cannons
- 2 x 60 kg bombs

Advantages:

- Good maneuverability;
- Good pilot visibility.

Disadvantages:

- Low damage threshold;
- Weak armament;
- Low top speed.

Pilot Notes:

- Switch supercharger speeds at 3,300 meters (10,800 feet)
- A6M5c is modeled with the Sakae 31a engine with methanol injection, instead of the Sakae 21. The cockpit has a gauge showing the quantity of the methanol mix. Unfortunately we were not able to find any detailed photos showing this gauge, and it is based on a diagram that may not adequately represent the historical gauge.

A6M7-62



Type: Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|---|----|----------------------------------|
| 1 | <i>Artificial Horizon</i> | 12 | Altimeter |
| 2 | <i>Turn & Bank Indicator</i> | 13 | <i>Cylinder Head Temperature</i> |
| 3 | <i>Mixture Indicator</i> | 14 | <i>Oil Temperature</i> |
| 4 | <i>Clock</i> | 15 | <i>Manifold Pressure</i> |
| 5 | Airspeed Indicator | 16 | <i>Oxygen Quantity</i> |
| 6 | Compass | 17 | <i>Oxygen Pressure</i> |
| 7 | <i>Variometer</i> | 18 | Fuel Level (Wing) |
| 8 | <i>Fuel Pressure & Oil Pressure</i> | 19 | Fuel Level (Fuselage) |
| 9 | <i>RPM Indicator</i> | 20 | <i>Internal System Indicator</i> |
| 10 | Compass | 21 | <i>Mixture Indicator</i> |
| 11 | <i>Magnetos</i> | | |

(A6M continued)

At a Glance:

Engine:

1 x NK1F Sakae-21

Power:

Take-off: 1,130 HP

Indicated: 1,100 HP at 3,500 m

Armament:

- 1 x 13,2-mm machine gun
- 2 x 20-mm Type 99 wing cannons
- 2 x 60 kg bombs

Advantages:

- Good maneuverability;
- Good pilot visibility.

Disadvantages:

- Low damage threshold;
- Weak armament;
- Low top speed.

Pilot Notes:

- Switch supercharger speeds at 3,300 meters (10,800 feet)
- A6M7 model 62 uses the Sakae 31a, however A6M7 model 63 reverts to Sakae 21 because of historical shortage of newer engines.
- The Sakae 31a engine is modeled with methanol injection. The cockpit has a gauge showing the quantity of the methanol mix. Unfortunately we were not able to find any detailed photos showing this gauge, and it is based on a diagram that may not adequately represent the historical gauge.

A6M7-63



Type: Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|------------------------------|----|------------------------------|
| 1 | Artificial Horizon | 11 | Magnetos |
| 2 | Turn & Bank Indicator | 12 | Altimeter |
| 3 | Mixture Indicator | 13 | Cylinder Head Temperature |
| 4 | Clock | 14 | Oil Temperature |
| 5 | Airspeed Indicator | 15 | Manifold Pressure |
| 6 | Compass | 16 | Oxygen Quantity |
| 7 | Variometer | 17 | Oxygen Pressure |
| 8 | Fuel Pressure & Oil Pressure | 18 | Fuel Level (Wing) |
| 9 | RPM Indicator | 19 | Fuel Level (Fuselage) |
| 10 | Compass | 20 | Internal System Indicator |

(A6M continued)

At a Glance:

Engine:

1 x NK1F Sakae-21

Power:

Take-off: 1,130 HP

Indicated: 1,100 HP at 3,500 m

Armament:

- 1 x 13,2-mm machine gun
- 2 x 20-mm Type 99 wing cannons
- 2 x 60 kg bombs

Advantages:

- Good maneuverability;
- Good pilot visibility.

Disadvantages:

- Low damage threshold;
- Weak armament;
- Low top speed.

Pilot Notes:

- Switch supercharger speeds at 3,300 meters (10,800 feet)
- A6M7 model 62 uses the Sakae 31a, however A6M7 model 63 reverts to Sakae 21 because of historical shortage of newer engines.
- The Sakae 31a engine is modeled with methanol injection. The cockpit has a gauge showing the quantity of the methanol mix. Unfortunately we were not able to find any detailed photos showing this gauge, and it is based on a diagram that may not adequately represent the historical gauge.

Ar-234B-2



Type: Jet Bomber

Major Users: Germany

Cockpit Guide:



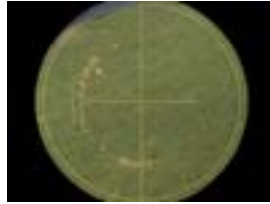
- | | | | |
|----|------------------------------|----|----------------------------------|
| 1 | Compass | 15 | Oil Pressure (Engine #2) |
| 2 | Airspeed Indicator | 16 | Fuel Pressure (Engine #1) |
| 3 | Turn & Bank Indicator | 17 | Fuel Pressure (Engine #2) |
| 4 | Variometer | 18 | Exhaust Temperature (Engine #1) |
| 5 | Altimeter | 19 | Exhaust Temperature (Engine #2) |
| 6 | Compass | 20 | Fuel Level (Front) |
| 7 | Pilot's Direction Indicator | 21 | Fuel Level (Rear) |
| 8 | Pitot Pressure (L / R) | 22 | Oxygen Pressure |
| 9 | RPM Indicator (Engine #1) | 23 | Oxygen Flow Indicator |
| 10 | RPM Indicator (Engine #2) | 24 | Landing Gear Indicator Lights |
| 11 | Clock | 25 | Hydraulic Pressure |
| 12 | Exhaust Pressure (Engine #1) | 26 | Overspeed Warning Light |
| 13 | Exhaust Pressure (Engine #2) | 27 | Fuel Level Warning Light (Front) |
| 14 | Oil Pressure (Engine #1) | 28 | Fuel Level Warning Light (Rear) |

(Ar-234 continued)

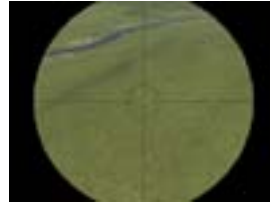
Other Playable Crew Positions:



Rear Stinger



Level Bombsight



Dive Sight

At a Glance:

Engine:

2 x Jumo-004B

Power: 2 x 900 kg/s

Advantages:

- Excellent Speed

Armament:

- 2 x 20mm MG-151 cannon (defensive)
- Up to 1,700 kg of bombs

Disadvantages:

- Difficult to handle
- Poor maneuverability
- Extremely short range at lower altitudes

Pilot Notes:

- The aircraft has no forward-firing armament. The trigger fires the twin MG-151/20 cannons situated in a stationary tail stinger. They can be fired at any time by pressing the trigger, and can be aimed by pressing the "*Toggle Gunsight*" button (Shift-F1 by default) when seated in the pilot's seat. This will switch your view to the telescopic sight located in the cockpit.
- The bomb-aiming equipment consists of the Lofte 7K level bombing sight, and the BZA-1 dive-bombing sight. In order to switch to the bombing mode, press the "*Pilot or Gunner Position*" button (C by default), and use the "*Toggle Gunsight*" button (Shift-F1 by default) to switch between the dive and level bombing sight optics.
- The BZA-1 modeled in the game is simpler than the actual sight used in the Blitz; the details cannot be modeled at this time due to inherent game engine restrictions. In the game, it's a simple point-and-shoot periscope that requires no parameter input. The horizontal "bone" shows the projected impact point of your bombs. The dive procedure is standard.
- The aircraft is also equipped with rocket-assisted-take-off (RATO) packs, which give it extra boost when taking-off, and are especially needed at heavy combat loads. The RATO packs are fully automated, and cannot be interacted with by the player. They will be automatically engaged should there be the need for it, and automatically jettisoned once they are expended. The lack of player's control is due to inherent game engine limitations.

(Ar-234 continued)

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Then the sight will automatically track the target, and drop the bombs automatically at the right time.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to acquire the target with the bombsight crosshair. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle up, and scan the horizon for the mission target.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course. Then using the *Increase Bombsight Distance* and *Decrease Bombsight Distance* keys place the crosshair on target. With the target dead center, turn on the targeting computer using the *Toggle Bombsight Automation* key. The bombsight will begin tracking the target. Correct the crosshair movement with the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys if necessary.
- The bombs will drop automatically when the plane reaches the proper position for a bomb drop, based on the input parameters and the optics angle.
- Note that after starting the bomb run, a plane may not be banked more than 4.5 degrees or the bombsight will lose stability. Only slight adjustments in direction are allowed. After more substantial maneuvers the bomb sight may take up to 30 seconds to stabilize. During the stabilization phase, the bomb sight crosshairs are turned off.

Using the Dive Sight:

- The dive sight is a simple forward-looking telescopic periscope. Initiate the dive using the standard dive-bombing procedure: line up on target, chop throttles, invert, and pull the stick to begin your dive. Switch to the sight optics, place the target in dead center, and once the caret marker drifts up and crosses over the target, press the Drop Bombs button and initiate the pullout.
- Be aware that the Ar-234 is a fast aircraft, and if traveling at very high speeds, you need to make corresponding adjustments during your dive.

*The aircraft is modeled without the manufacturing defects with balanced ailerons.
BZA-1 dive bombing sight is simplified.*

B-239



Type: Fighter

Major Users: Finland

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Airspeed Indicator | 10 | Free Air Temperature |
| 2 | Turn & Bank Indicator | 11 | Oil Temp & Pressure; Fuel Pressure |
| 3 | Manifold Pressure | 12 | Cylinder Head Temperature |
| 4 | Altimeter | 13 | Fuel Level |
| 5 | Compass | 14 | Fuel Level |
| 6 | Artificial Horizon | 15 | Hydraulic Pressure |
| 7 | Variometer | 16 | Ammunition Counter (left side) |
| 8 | Clock | 17 | Ammunition Counter (right side) |
| 9 | RPM Indicator (Engine #1) | | |

(Brewster continued)

At a Glance:

Engine:

R-1820-G5

Power:

Continuous: 850 HP

Take-off : 950 HP

Combat (WEP) max 5min: 1,000 HP

Armament:

- 3 x .50cal + 1 x .30cal
- Later 4 x .50cal (12.7mm)

Advantages:

- Good maneuverability and handling;
- Spacious and well-organized cockpit;
- Good visibility.

Disadvantages:

- Obsolete compared to contemporary Axis planes;
- Inadequate speed and armament compared to late war planes.

Pilot Notes:

Take-Off Speed: 140 km/h

Landing Speed: 135 km/h

Combat Engine Setting: No RPM gauge

Best Cruise: No RPM gauge

Economy Cruise: No RPM gauge

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- Buffalo is a decent dogfighter against most pre-1943 fighters, with the exception of the Zero. Brewster will outturn almost any plane in a high-G instantaneous turn, however it will bleed off excessive amounts of speed in sustained turns. Your best bet against enemy fighters is to stay fast and not get involved in prolonged turning engagements, especially at low altitudes.
- Buffalo's armament is not particularly strong but it is adequate against most planes, with the possible exception of the IL-2. You will usually need at least a one-second burst at a vulnerable area to bring your target down. Just like with all machine-gun only planes, the best spot to aim for is the pilot.
- Brewster can stall rather easily if handled roughly, however when it is handled with care it can be a very tough opponent.
- Supercharger speeds need to be switched at around 3,000 meters. Best performance altitude is between 500 and 2,800 meters.
- Worst performance above 4,500 meters

Bf-109E-4



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | |
|----|-------------------------------|----|
| 1 | Clock | 16 |
| 2 | Gunsight | 17 |
| 3 | Altimeter | 18 |
| 4 | Compass | 19 |
| 5 | Manifold Pressure | 20 |
| 6 | Airspeed Indicator | 21 |
| 7 | Turn & Bank Indicator | 22 |
| 8 | RPM Indicator | 23 |
| 9 | Prop Pitch Indicator | 24 |
| 10 | Oil Pressure; Fuel Pressure | 25 |
| 11 | Landing Gear Indicator Lights | 26 |
| 12 | Fuel Level | 27 |
| 13 | Radiator Temperature | 28 |
| 14 | Coolant Temperature | 29 |
| 15 | | 30 |

(Bf-109 continued)

At a Glance:

Engine:

DB 601A-1.

Power: 1,175 HP

Armament:

- 2 x 7.92 mm (MG 17);
- 2 x 20 mm cannon (MG FF/M)

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Easy to fly.

Disadvantages:

- Poor rear visibility;
- Short range;
- Difficulties firing the wing guns.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 2,000 RPM

Economy Cruise: 1,900 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: Yes, 5 minute maximum

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Emil version of the 109 was made famous during the Battle of Britain in 1940. By summer of 1941 it was becoming obsolete, however it can fare quite well against even more obsolete Soviet fighters that face it during that period. Its main, and often the only advantage lies in its superior speed. Emil stands absolutely no chance in a turning fight against an I-153 or a well flown I-16, however in a high-speed vertical fight it can handle them with ease.
- Your best combat tactic is to fly at a high altitude, climb at least 500 meters above the Soviet fighters after you see them, and then gain even more speed in a dive as you attack. Coming in at 500 km/h or so should almost guarantee that you'll leave the engagement area without a scratch; and whether you can score a kill is of course up to your gunnery skills.
- Emil's armament is not one of its strongest points. In addition to two rifle caliber machine guns it is armed with twin 20mm MG FF cannons which have a rather slow rate of fire. Their location in the wings means you may not get great results when firing outside of convergence range. However, an accurate burst from all weapons at a vulnerable area should deal with any target with ease.
- Emil does not stall easily, however that does not mean you can yank the joystick all over the cockpit. Fly it gently and don't do any rough maneuvers.
- When used as ground attack, bombs should be dropped in a 45 degree dive using the red line on the side of the canopy as dive angle reference.

Bf-109E-4/B



Type: Fighter-Bomber

Major Users: Germany

Cockpit Guide:



- 1 Clock
- 2 Gunsight
- 3 **Altimeter**
- 4 **Compass**
- 5 Manifold Pressure
- 6 **Airspeed Indicator**
- 7 Turn & Bank Indicator

- 8 RPM Indicator
- 9 Prop Pitch Indicator
- 10 Fuel Pressure; Oil Pressure
- 11 Landing Gear Indicator Lights
- 12 **Fuel Level**
- 13 Radiator Temperature
- 14 Coolant Temperature

(Bf-109 continued)

At a Glance:

Engine:

DB 601A-1.

Power: 1,175 HP

Armament:

- 2 x 7.92 mm (MG 17);
- 2 x 20 mm cannon (MG FF/M)
- Up to 250 kg of bombs.

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Easy to fly.

Disadvantages:

- Poor rear visibility;
- Short range;
- Difficulties firing the wing guns.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 2,000 RPM

Economy Cruise: 1,900 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: Yes, 5 minute maximum

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Emil version of the 109 was made famous during the Battle of Britain in 1940. By summer of 1941 it was becoming obsolete, however it can fare quite well against even more obsolete Soviet fighters that face it during that period. Its main, and often the only advantage lies in its superior speed. Emil stands absolutely no chance in a turning fight against an I-153 or a well flown I-16, however in a high-speed vertical fight it can handle them with ease.
- Your best combat tactic is to fly at a high altitude, climb at least 500 meters above the Soviet fighters after you see them, and then gain even more speed in a dive as you attack. Coming in at 500 km/h or so should almost guarantee that you'll leave the engagement area without a scratch; and whether you can score a kill is of course up to your gunnery skills.
- Emil's armament is not one of its strongest points. In addition to two rifle caliber machine guns it is armed with twin 20mm MG FF cannons which have a rather slow rate of fire. Their location in the wings means you may not get great results when firing outside of convergence range. However, an accurate burst from all weapons at a vulnerable area should deal with any target with ease.
- Emil does not stall easily, however that does not mean you can yank the joystick all over the cockpit. Fly it gently and don't do any rough maneuvers.
- When used as ground attack, bombs should be dropped in a 45 degree dive using the red line on the side of the canopy as dive angle reference.

Bf-109E-7/B



Type: Fighter-Bomber

Major Users: Germany

Cockpit Guide:



- | | | | |
|---|---------------------------|----|-------------------------------|
| 1 | Clock | 8 | RPM Indicator |
| 2 | Gunsight | 9 | Prop Pitch Indicator |
| 3 | Altimeter | 10 | Fuel Pressure; Oil Pressure |
| 4 | Compass | 11 | Landing Gear Indicator Lights |
| 5 | Manifold Pressure | 12 | Fuel Level |
| 6 | Airspeed Indicator | 13 | Radiator Temperature |
| 7 | Turn & Bank Indicator | 14 | Coolant Temperature |

(Bf-109 continued)

At a Glance:

Engine:

DB 601A-1.

Power: 1,175 HP

Armament:

- 2 x 7.92 mm (MG 17);
- 2 x 20 mm cannon (MG FF/M)
- Up to 250 kg of bombs.

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Easy to fly.

Disadvantages:

- Poor rear visibility;
- Short range;
- Difficulties firing the wing guns.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 2,000 RPM

Economy Cruise: 1,900 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: Yes, 5 minute maximum

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Emil version of the 109 was made famous during the Battle of Britain in 1940. By summer of 1941 it was becoming obsolete, however it can fare quite well against even more obsolete Soviet fighters that face it during that period. Its main, and often the only advantage lies in its superior speed. Emil stands absolutely no chance in a turning fight against an I-153 or a well flown I-16, however in a high-speed vertical fight it can handle them with ease.
- Your best combat tactic is to fly at a high altitude, climb at least 500 meters above the Soviet fighters after you see them, and then gain even more speed in a dive as you attack. Coming in at 500 km/h or so should almost guarantee that you'll leave the engagement area without a scratch; and whether you can score a kill is of course up to your gunnery skills.
- Emil's armament is not one of its strongest points. In addition to two rifle caliber machine guns it is armed with twin 20mm MG FF cannons which have a rather slow rate of fire. Their location in the wings means you may not get great results when firing outside of convergence range. However, an accurate burst from all weapons at a vulnerable area should deal with any target with ease.
- Emil does not stall easily, however that does not mean you can yank the joystick all over the cockpit. Fly it gently and don't do any rough maneuvers.
- When used as ground attack, bombs should be dropped in a 45 degree dive using the red line on the side of the canopy as dive angle reference.

Bf-109E-7/Z



Type: Fighter-Bomber

Major Users: Germany

Cockpit Guide:



- 1 Clock
- 2 Gunsight
- 3 **Altimeter**
- 4 **Compass**
- 5 Manifold Pressure
- 6 **Airspeed Indicator**
- 7 Turn & Bank Indicator

- 8 RPM Indicator
- 9 Prop Pitch Indicator
- 10 Fuel Pressure; Oil Pressure
- 11 Landing Gear Indicator Lights
- 12 **Fuel Level**
- 13 Radiator Temperature
- 14 Coolant Temperature

(Bf-109 continued)

At a Glance:

Engine:

DB 601A-1.

Power: 1,175 HP

Armament:

- 2 x 7.92 mm (MG 17);
- 2 x 20 mm cannon (MG FF/M)
- Up to 250 kg of bombs.

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Easy to fly.

Disadvantages:

- Poor rear visibility;
- Short range;
- Difficulties firing the wing guns.

Pilot Notes:

Take-Off Speed: 165 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,200 RPM

Best Cruise: 2,000 RPM

Economy Cruise: 1,900 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: Yes, 5 minute maximum

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Emil version of the 109 was made famous during the Battle of Britain in 1940. By summer of 1941 it was becoming obsolete, however it can fare quite well against even more obsolete Soviet fighters that face it during that period. Its main, and often the only advantage lies in its superior speed. Emil stands absolutely no chance in a turning fight against an I-153 or a well flown I-16, however in a high-speed vertical fight it can handle them with ease.
- Your best combat tactic is to fly at a high altitude, climb at least 500 meters above the Soviet fighters after you see them, and then gain even more speed in a dive as you attack. Coming in at 500 km/h or so should almost guarantee that you'll leave the engagement area without a scratch; and whether you can score a kill is of course up to your gunnery skills.
- Emil's armament is not one of its strongest points. In addition to two rifle caliber machine guns it is armed with twin 20mm MG FF cannons which have a rather slow rate of fire. Their location in the wings means you may not get great results when firing outside of convergence range. However, an accurate burst from all weapons at a vulnerable area should deal with any target with ease.
- Emil does not stall easily, however that does not mean you can yank the joystick all over the cockpit. Fly it gently and don't do any rough maneuvers.
- When used as ground attack, bombs should be dropped in a 45 degree dive using the red line on the side of the canopy as dive angle reference.

Bf-109F-2



Type: Fighter

Major Users: Germany

Cockpit Guide:



- 1 Ammunition Counters
- 2 Clock
- 3 Altimeter
- 4 **Compass**
- 5 Manifold Pressure
- 6 **Airspeed Indicator**
- 7 Turn & Bank Indicator
- 8 RPM Indicator

- 9 Magnetos
- 10 Landing Gear Indicator Lights
- 11 Prop Pitch Indicator
- 12 Coolant Temperature
- 13 Fuel Level Warning Light
- 14 **Fuel Level**
- 15 Fuel Pressure; Oil Pressure

(Bf-109 continued)

At a Glance:

Engine:

DB 601H.

Power: 1,200 HP

Armament:

- 2 x 7.92mm (MG 17)
- 1 x 15 mm (MG 151/15)

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Adequate armament;
- Easy to fly.

Disadvantages:

- Poor rear visibility;
- Short range;
- Weaker armament compared to the 109E.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto/Manual

Mixture Control: Manual

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- Bf-109F is a highly improved version of the Emil. You can really feel the added power and reduced drag; Franz is almost 100 km/h faster. Capable pilots can dogfight most Soviet planes even in high-G turning fights, however the easiest way to win is still by keeping your airspeed up. Few 1941 and 1942 Soviet planes can achieve 500 km/h in level flight, and their acceleration above 400 km/h is really inferior to that of your 109F. So keep your airspeed up, fly higher than the Soviets and you can come down on them time after time with almost absolute impunity.
- The armament on the Franz however is not very good. F-2 is armed with a single 15mm, and F-4 with a single 20mm nose cannon. While its location in the nose makes aiming from any distance very easy, its slow rate of fire and rather small caliber often make their effects less than perfect. Much more so than with any other plane you should take care to aim at a vulnerable spot – cockpit, engine, fuel tank – to bring down your target in one burst.
- 109 is not a very stable gunnery platform under 350 km/h and you may find your aim getting thrown off and your rounds scattering too much when firing at slow speeds. Accelerate to 350 km/h or more and your bursts should be much more accurate.
- It's very hard to stall or spin the Franz but that certainly has been done by some less capable pilots who were too rough with their crate.

Bf-109F-4



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|---|---------------------------|----|-------------------------------|
| 1 | Ammunition Counters | 9 | Magnetos |
| 2 | Clock | 10 | Landing Gear Indicator Lights |
| 3 | Altimeter | 11 | Prop Pitch Indicator |
| 4 | Compass | 12 | Coolant Temperature |
| 5 | Manifold Pressure | 13 | Fuel Level Warning Light |
| 6 | Airspeed Indicator | 14 | Fuel Level |
| 7 | Turn & Bank Indicator | 15 | Fuel Pressure; Oil Pressure |
| 8 | RPM Indicator | | |

(Bf-109 continued)

At a Glance:

Engine:

DB 601H.

Power: 1,200 HP

Armament:

- 2 x 7.92mm (MG 17)
- 1 x 20 mm (MG 151/20)

Advantages:

- Excellent performance characteristics;
- Good maneuverability;
- Adequate armament;
- Easy to fly.

Disadvantages:

- Poor rear visibility;
- Short range.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto/Manual

Mixture Control: Manual

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- Bf-109F is a highly improved version of the Emil. You can really feel the added power and reduced drag; Franz is almost 100 km/h faster. Capable pilots can dogfight most Soviet planes even in high-G turning fights, however the easiest way to win is still by keeping your airspeed up. Few 1941 and 1942 Soviet planes can achieve 500 km/h in level flight, and their acceleration above 400 km/h is really inferior to that of your 109F. So keep your airspeed up, fly higher than the Soviets and you can come down on them time after time with almost absolute impunity.
- The armament on the Franz however is not very good. F-2 is armed with a single 15mm, and F-4 with a single 20mm nose cannon. While its location in the nose makes aiming from any distance very easy, its slow rate of fire and rather small caliber often make their effects less than perfect. Much more so than with any other plane you should take care to aim at a vulnerable spot – cockpit, engine, fuel tank – to bring down your target in one burst.
- 109 is not a very stable gunnery platform under 350 km/h and you may find your aim getting thrown off and your rounds scattering too much when firing at slow speeds. Accelerate to 350 km/h or more and your bursts should be much more accurate.
- It's very hard to stall or spin the Franz but that certainly has been done by some less capable pilots who were too rough with their crate.

Bf-109G-2



Type: Fighter

Major Users: Germany

Cockpit Guide:



- 1 Ammunition Counters
- 2 Clock
- 3 **Compass**
- 4 Turn & Bank Indicator
- 5 Manifold Pressure
- 6 **Altimeter**
- 7 **Airspeed Indicator**
- 8 RPM Indicator

- 9 Magnetos
- 10 Landing Gear Indicator Lights
- 11 Prop Pitch Indicator
- 12 Coolant Temperature
- 13 Fuel Level Warning Light
- 14 **Fuel Level**
- 15 Fuel Pressure; Oil Pressure

(Bf-109 continued)

At a Glance:

Engine:

DB 605A-1.

Power:

Indicated: 1,355 HP

Take-off: 1,475 HP

Armament:

- 2 x 7.92 mm (MG 17)
- 1 x 20 mm (MG 151/20)

Advantages:

- Excellent maneuverability and acceleration;
- Excellent overall performance;
- Strong armament;
- Easy to fly.

Disadvantages:

- Poor rear visibility;
- Heavier construction;
- Short range.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto/ Manual

Mixture Control: Manual

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Gustav model of the 109 shows an incredible ability to keep the fighter's design a step ahead of most contemporary enemy planes. With the possible exception of the 1943 G-6, you will never feel inferior to any contemporary enemy fighter in your new 109 model. The same engagement strategies apply here as to the Franz and Emil. Feel free to enter an angles fight with the enemy if you feel confident enough. If you're looking for an easy victory, stay above 450 km/h in a fight and attack the enemy in 500 km/h+ dives and you should be able to defeat almost any opponent.
- 109's armament is always enough to bring down a fighter, but can sometimes be a bit insufficient against better armored bombers like the IL-2. When you know you'll have to face targets like that make sure to grab underwing gun pods, or a 30mm MK-108 cannon in the nose. With the gunpods or the MK-108 you will bring down any target with a single accurate burst.
- 109 is not a very stable gunnery platform under 350 km/h and you may find your aim getting thrown off and your rounds scattering too much when firing at slow speeds. Accelerate to 350 km/h or more and your bursts should be much more accurate.
- It's very hard to stall or spin the 109 but that certainly has been done by some less capable pilots who were too rough with their crate.

Bf-109G-6



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|---|----------------------------------|----|--------------------------------------|
| 1 | <i>Ammunition Counters</i> | 9 | <i>Landing Gear Indicator Lights</i> |
| 2 | <i>Clock</i> | 10 | <i>Pilot's Direction Indicator</i> |
| 3 | Compass | 11 | <i>Prop Pitch Indicator</i> |
| 4 | <i>Turn & Bank Indicator</i> | 12 | <i>Coolant Temperature</i> |
| 5 | <i>Manifold Pressure</i> | 13 | <i>Fuel Level Warning Light</i> |
| 6 | Altimeter | 14 | Fuel Level |
| 7 | Airspeed Indicator | 15 | <i>Fuel Pressure; Oil Pressure</i> |
| 8 | <i>RPM Indicator</i> | | |

(Bf-109 continued)

At a Glance:

Engine:

DB 605A-1.

Power:

Indicated: 1,300 HP

Take-off : 1,550 HP

Armament:

- 2 x 13 mm (MG 131).
- 1 x 20 mm (MG 151/20)
or
- 1 x 30 mm (MG 108).

Advantages:

- Strong armament;
- Good cockpit visibility;
- Easy to fly.

Disadvantages:

- Poor speed characteristics;
- Heavier construction;
- Short range.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto/ Manual

Mixture Control: Manual

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Gustav model of the 109 shows an incredible ability to keep the fighter's design a step ahead of most contemporary enemy planes. With the possible exception of the 1943 G-6, you will never feel inferior to any contemporary enemy fighter in your new 109 model. The same engagement strategies apply here as to the Franz and Emil. Feel free to enter an angles fight with the enemy if you feel confident enough. If you're looking for an easy victory, stay above 450 km/h in a fight and attack the enemy in 500 km/h+ dives and you should be able to defeat almost any opponent.
- 109's armament is always enough to bring down a fighter, but can sometimes be a bit insufficient against better armored bombers like the IL-2. When you know you'll have to face targets like that make sure to grab underwing gun pods, or a 30mm MK-108 cannon in the nose. With the gunpods or the MK-108 you will bring down any target with a single accurate burst.
- 109 is not a very stable gunnery platform under 350 km/h and you may find your aim getting thrown off and your rounds scattering too much when firing at slow speeds. Accelerate to 350 km/h or more and your bursts should be much more accurate.
- It's very hard to stall or spin the 109 but that certainly has been done by some less capable pilots who were too rough with their crate.

Bf-109G-6 Late



Type: Fighter

Major Users: Germany

Cockpit Guide:



- 1 Ammunition Counters
- 2 Clock
- 3 **Compass**
- 4 Turn & Bank Indicator
- 5 Manifold Pressure
- 6 **Altimeter**
- 7 **Airspeed Indicator**
- 8 RPM Indicator

- 9 Landing Gear Indicator Lights
- 10 Pilot's Direction Indicator
- 11 Prop Pitch Indicator
- 12 Coolant Temperature
- 13 Fuel Level Warning Light
- 14 **Fuel Level**
- 15 Fuel Pressure; Oil Pressure

(Bf-109 continued)

At a Glance:

Engine:

DB 605A-1.

Power:

Indicated: 1,300 HP;

Take-off : 1,550 HP

Armament:

- 2 x 13 mm (MG 131).
- 1 x 20 mm (MG 151/20)
or
- 1 x 30 mm (MG 108).

Advantages:

- Strong armament;
- Good cockpit visibility;
- Easy to fly.

Disadvantages:

- Poor speed characteristics;
- Wooden tail unit;
- Short range.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto/ Manual

Mixture Control: Manual

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Gustav model of the 109 shows an incredible ability to keep the fighter's design a step ahead of most contemporary enemy planes. With the possible exception of the 1943 G-6, you will never feel inferior to any contemporary enemy fighter in your new 109 model. The same engagement strategies apply here as to the Franz and Emil. Feel free to enter an angles fight with the enemy if you feel confident enough. If you're looking for an easy victory, stay above 450 km/h in a fight and attack the enemy in 500 km/h+ dives and you should be able to defeat almost any opponent.
- 109's armament is always enough to bring down a fighter, but can sometimes be a bit insufficient against better armored bombers like the IL-2. When you know you'll have to face targets like that make sure to grab underwing gun pods, or a 30mm MK-108 cannon in the nose. With the gunpods or the MK-108 you will bring down any target with a single accurate burst.
- 109 is not a very stable gunnery platform under 350 km/h and you may find your aim getting thrown off and your rounds scattering too much when firing at slow speeds. Accelerate to 350 km/h or more and your bursts should be much more accurate.
- It's very hard to stall or spin the 109 but that certainly has been done by some less capable pilots who were too rough with their crate.

Bf-109G-6AS



Type: Fighter

Major Users: Germany

Cockpit Guide:



- 1 Ammunition Counters
- 2 Clock
- 3 **Compass**
- 4 Turn & Bank Indicator
- 5 Manifold Pressure
- 6 **Altimeter**
- 7 **Airspeed Indicator**
- 8 RPM Indicator

- 9 Landing Gear Indicator Lights
- 10 Pilot's Direction Indicator
- 11 Prop Pitch Indicator
- 12 Coolant Temperature
- 13 Fuel Level Warning Light
- 14 **Fuel Level**
- 15 Fuel Pressure; Oil Pressure

(Bf-109 continued)

At a Glance:

Engine:

DB 605ASM.

Power:

Indicated: 1,300 HP;

Take-off : 2,000 HP

Armament:

- 2 x 13 mm (MG 131).
- 1 x 20 mm (MG 151/20)
or
- 1 x 30 mm (MG 108).

Advantages:

- Excellent performance characteristics;
- Strong armament;
- Good cockpit visibility;
- Easy to fly.

Disadvantages:

- Poor engine durability;
- Short range.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto/ Manual

Mixture Control: Manual

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Gustav model of the 109 shows an incredible ability to keep the fighter's design a step ahead of most contemporary enemy planes. With the possible exception of the 1943 G-6, you will never feel inferior to any contemporary enemy fighter in your new 109 model. The same engagement strategies apply here as to the Franz and Emil. Feel free to enter an angles fight with the enemy if you feel confident enough. If you're looking for an easy victory, stay above 450 km/h in a fight and attack the enemy in 500 km/h+ dives and you should be able to defeat almost any opponent.
- 109's armament is always enough to bring down a fighter, but can sometimes be a bit insufficient against better armored bombers like the IL-2. When you know you'll have to face targets like that make sure to grab underwing gun pods, or a 30mm MK-108 cannon in the nose. With the gunpods or the MK-108 you will bring down any target with a single accurate burst.
- 109 is not a very stable gunnery platform under 350 km/h and you may find your aim getting thrown off and your rounds scattering too much when firing at slow speeds. Accelerate to 350 km/h or more and your bursts should be much more accurate.
- It's very hard to stall or spin the 109 but that certainly has been done by some less capable pilots who were too rough with their crate.

Bf-109G-10



Type: Fighter

Major Users: Germany

Cockpit Guide:



- 1 Ammunition Counters
- 2 Clock
- 3 **Compass**
- 4 Turn & Bank Indicator
- 5 Manifold Pressure
- 6 **Altimeter**
- 7 **Airspeed Indicator**
- 8 RPM Indicator

- 9 Landing Gear Indicator Lights
- 10 Pilot's Direction Indicator
- 11 Prop Pitch Indicator
- 12 Coolant Temperature
- 13 Fuel Level Warning Light
- 14 **Fuel Level**
- 15 Fuel Pressure; Oil Pressure

(Bf-109 continued)

At a Glance:

Engine:

DB 605 D.

Power:

Take-off : 1,800 HP

Armament:

- 2 x 13 mm (MG 131).
- 1 x 30 mm cannon (MK 108).

Advantages:

- Excellent performance characteristics;
- Strong armament;
- Good cockpit visibility;
- Easy to fly.

Disadvantages:

- Poor engine durability;
- Short range;
- Deteriorating war conditions leading to poor manufacturing quality.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto/ Manual

Mixture Control: Manual

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Gustav model of the 109 shows an incredible ability to keep the fighter's design a step ahead of most contemporary enemy planes. With the possible exception of the 1943 G-6, you will never feel inferior to any contemporary enemy fighter in your new 109 model. The same engagement strategies apply here as to the Franz and Emil. Feel free to enter an angles fight with the enemy if you feel confident enough. If you're looking for an easy victory, stay above 450 km/h in a fight and attack the enemy in 500 km/h+ dives and you should be able to defeat almost any opponent.
- 109's armament is always enough to bring down a fighter, but can sometimes be a bit insufficient against better armored bombers like the IL-2. When you know you'll have to face targets like that make sure to grab underwing gun pods, or a 30mm MK-108 cannon in the nose. With the gunpods or the MK-108 you will bring down any target with a single accurate burst.
- 109 is not a very stable gunnery platform under 350 km/h and you may find your aim getting thrown off and your rounds scattering too much when firing at slow speeds. Accelerate to 350 km/h or more and your bursts should be much more accurate.
- It's very hard to stall or spin the 109 but that certainly has been done by some less capable pilots who were too rough with their crate.

Bf-109G-14



Type: Fighter

Major Users: Germany

Cockpit Guide:



- 1 Ammunition Counters
- 2 Clock
- 3 **Compass**
- 4 Turn & Bank Indicator
- 5 Manifold Pressure
- 6 **Altimeter**
- 7 **Airspeed Indicator**
- 8 RPM Indicator
- 9 Magnetos
- 10 Landing Gear Indicator Lights

- 11 Pilot's Direction Indicator
- 12 Prop Pitch Indicator
- 13 Coolant Temperature
- 14 Fuel Level Warning Light
- 15 **Fuel Level**
- 16 Fuel Pressure; Oil Pressure
- 17 MW-50 Indicator
- 18 Oxygen Pressure
- 19 Oxygen Quantity

(Bf-109 continued)

At a Glance:

Engine:

DB 605AM

or

DB 605ASM

Power:

Indicated: 1,425 HP

Take-off: 1,800 HP

Armament:

- 2 x 13mm (MG 131)
- 1 x 30mm (MK 108)

Advantages:

- Excellent performance characteristics;
- Strong armament;
- Good cockpit visibility;
- Easy to fly.

Disadvantages:

- Poor engine durability;
- Short range;
- Deteriorating war conditions leading to poor manufacturing quality.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto/ Manual

Mixture Control: Manual

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Gustav model of the 109 shows an incredible ability to keep the fighter's design a step ahead of most contemporary enemy planes. With the possible exception of the 1943 G-6, you will never feel inferior to any contemporary enemy fighter in your new 109 model. The same engagement strategies apply here as to the Franz and Emil. Feel free to enter an angles fight with the enemy if you feel confident enough. If you're looking for an easy victory, stay above 450 km/h in a fight and attack the enemy in 500 km/h+ dives and you should be able to defeat almost any opponent.
- 109's armament is always enough to bring down a fighter, but can sometimes be a bit insufficient against better armored bombers like the IL-2. When you know you'll have to face targets like that make sure to grab underwing gun pods, or a 30mm MK-108 cannon in the nose. With the gunpods or the MK-108 you will bring down any target with a single accurate burst.
- 109 is not a very stable gunnery platform under 350 km/h and you may find your aim getting thrown off and your rounds scattering too much when firing at slow speeds. Accelerate to 350 km/h or more and your bursts should be much more accurate.
- It's very hard to stall or spin the 109 but that certainly has been done by some less capable pilots who were too rough with their crate.

Bf-109K-4



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|-------------------------------|----|--------------------------|
| 1 | Ammunition Counters | 12 | RPM Indicator |
| 2 | MW-50 Pressure | 13 | Manifold Pressure |
| 3 | Airspeed Indicator | 14 | Coolant Temperature |
| 4 | Turn & Bank Indicator | 15 | Oil Temperature |
| 5 | Variometer | 16 | Prop Pitch Indicator |
| 6 | Altimeter | 17 | Fuel Level |
| 7 | Compass | 18 | MW-50 Indicator |
| 8 | Pilot's Direction Indicator | 19 | Oxygen Flow Indicator |
| 9 | Clock | 20 | Oxygen Quantity |
| 10 | Landing Gear Indicator Lights | 21 | Fuel Level Warning Light |
| 11 | Fuel Pressure; Oil Pressure | | |

(Bf-109 continued)

At a Glance:

Engine:

DB 605 D.

Power:

Take-off : 1,800 HP

Armament:

- 2 x 13 mm (MG 131).
- 1 x 30 mm cannon (MK 108).

Advantages:

- Excellent performance characteristics;
- Strong armament;
- Good cockpit visibility;
- Easy to fly.

Disadvantages:

- Poor engine durability;
- Short range;
- Deteriorating war conditions leading to poor manufacturing quality.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto/ Manual

Mixture Control: Manual

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Gustav model of the 109 shows an incredible ability to keep the fighter's design a step ahead of most contemporary enemy planes. With the possible exception of the 1943 G-6, you will never feel inferior to any contemporary enemy fighter in your new 109 model. The same engagement strategies apply here as to the Franz and Emil. Feel free to enter an angles fight with the enemy if you feel confident enough. If you're looking for an easy victory, stay above 450 km/h in a fight and attack the enemy in 500 km/h+ dives and you should be able to defeat almost any opponent.
- 109's armament is always enough to bring down a fighter, but can sometimes be a bit insufficient against better armored bombers like the IL-2. When you know you'll have to face targets like that make sure to grab underwing gun pods, or a 30mm MK-108 cannon in the nose. With the gunpods or the MK-108 you will bring down any target with a single accurate burst.
- 109 is not a very stable gunnery platform under 350 km/h and you may find your aim getting thrown off and your rounds scattering too much when firing at slow speeds. Accelerate to 350 km/h or more and your bursts should be much more accurate.
- It's very hard to stall or spin the 109 but that certainly has been done by some less capable pilots who were too rough with their crate.

Bf-109K-4 C3



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|-------------------------------|----|--------------------------|
| 1 | Ammunition Counters | 12 | RPM Indicator |
| 2 | MW-50 Pressure | 13 | Manifold Pressure |
| 3 | Airspeed Indicator | 14 | Coolant Temperature |
| 4 | Turn & Bank Indicator | 15 | Oil Temperature |
| 5 | Variometer | 16 | Prop Pitch Indicator |
| 6 | Altimeter | 17 | Fuel Level |
| 7 | Compass | 18 | MW-50 Indicator |
| 8 | Pilot's Direction Indicator | 19 | Oxygen Flow Indicator |
| 9 | Clock | 20 | Oxygen Quantity |
| 10 | Landing Gear Indicator Lights | 21 | Fuel Level Warning Light |
| 11 | Fuel Pressure; Oil Pressure | | |

(Bf-109 continued)

At a Glance:

Engine:

DB 605 D.

Power:

Take-off : 1,800 HP

Armament:

- 2 x 13 mm (MG 131).
- 1 x 30 mm cannon (MK 108).

Advantages:

- Excellent performance characteristics;
- Strong armament;
- Good cockpit visibility;
- Easy to fly.

Disadvantages:

- Poor engine durability;
- Short range;
- Deteriorating war conditions leading to poor manufacturing quality.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto/ Manual

Mixture Control: Manual

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Gustav model of the 109 shows an incredible ability to keep the fighter's design a step ahead of most contemporary enemy planes. With the possible exception of the 1943 G-6, you will never feel inferior to any contemporary enemy fighter in your new 109 model. The same engagement strategies apply here as to the Franz and Emil. Feel free to enter an angles fight with the enemy if you feel confident enough. If you're looking for an easy victory, stay above 450 km/h in a fight and attack the enemy in 500 km/h+ dives and you should be able to defeat almost any opponent.
- 109's armament is always enough to bring down a fighter, but can sometimes be a bit insufficient against better armored bombers like the IL-2. When you know you'll have to face targets like that make sure to grab underwing gun pods, or a 30mm MK-108 cannon in the nose. With the gunpods or the MK-108 you will bring down any target with a single accurate burst.
- 109 is not a very stable gunnery platform under 350 km/h and you may find your aim getting thrown off and your rounds scattering too much when firing at slow speeds. Accelerate to 350 km/h or more and your bursts should be much more accurate.
- It's very hard to stall or spin the 109 but that certainly has been done by some less capable pilots who were too rough with their crate.

Bf-109Z



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|---|-------------------------------|----|---|
| 1 | Ammunition Counters | 10 | Coolant Temperature (Engine #1) |
| 2 | Clock | 11 | Coolant Temperature (Engine #2) |
| 3 | Compass | 12 | Fuel Pressure; Oil Pressure (Engine #1) |
| 4 | Turn & Bank Indicator | 13 | Fuel Pressure; Oil Pressure (Engine #2) |
| 5 | Altimeter | 14 | Pilot's Direction Indicator |
| 6 | Airspeed Indicator | 15 | Fuel Level Warning Light |
| 7 | Landing Gear Indicator Lights | 16 | Prop Pitch Indicator |
| 8 | RPM Indicator (Engine #1) | 17 | Fuel Level |
| 9 | RPM Indicator (Engine #2) | | |

(Bf-109 continued)

At a Glance:

Engine:

2 x DB 605A-1.

Power:

Indicated: 2 x 1,355 HP;

Take-off : 2 x 1,475 HP

Armament:

- 4 x 30 mm (Mk 108).
- 1 x 30 mm (Mk 103).

Advantages:

- Strong armament;
- Good cockpit visibility;

Disadvantages:

- Poor speed characteristics;
- Short range.
- Sub-standard maneuverability

Bf-110G-2



Type: Fighter-Bomber

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|---|----|---|
| 1 | <i>Clock</i> | 17 | Altimeter |
| 2 | <i>Pilot's Direction Indicator</i> | 18 | <i>RPM Indicator (Engine #1)</i> |
| 3 | <i>Ammunition Counters</i> | 19 | <i>RPM Indicator (Engine #2)</i> |
| 4 | <i>Ammunition Warning Light (Right)</i> | 20 | <i>Coolant Temperature (Engine #1)</i> |
| 5 | <i>Ammunition Warning Light (Left)</i> | 21 | Fuel Level |
| 6 | <i>Landing Gear Indicator Lights</i> | 22 | <i>Coolant Temperature (Engine #2)</i> |
| 7 | Compass | 23 | <i>Manifold Pressure (Engine #1)</i> |
| 8 | <i>Internal System Indicator</i> | 24 | <i>Manifold Pressure (Engine #2)</i> |
| 9 | <i>Turn & Bank Indicator</i> | 25 | <i>Air Pressure</i> |
| 10 | <i>Variometer</i> | 26 | <i>Oxygen Flow Indicator</i> |
| 11 | <i>Altitude above Ground</i> | 27 | <i>Oxygen Pressure</i> |
| 12 | <i>System Switch</i> | 28 | <i>Fuel Level Warning Light (Left Front)</i> |
| 13 | <i>Free Air Temperature</i> | 29 | <i>Fuel Level Warning Light (Left Rear)</i> |
| 14 | <i>Compass</i> | 30 | <i>Fuel Level Warning Light (Right Front)</i> |
| 15 | <i>Artificial Horizon</i> | 31 | <i>Fuel Level Warning Light (Right Rear)</i> |
| 16 | Airspeed Indicator | | |

(Bf-110 continued)

Other Playable Crew Positions:



Rear Gunner

At a Glance:

Engine:

2 x DB 605B

Power: 1,475HP

Advantages:

- Excellent firepower;
- Good turning radius;
- Very pleasant and safe to fly.

Armament:

- 4 x 7.92mm MG 17
- 2 x 20mm MG 151/20
- 2 x 7.92mm MG 81Z

Disadvantages:

- Slow roll rate;
- Rather heavy control forces at medium to high speeds;
- Slow compared to mid and late war fighters.

D3A1



Type: Carrier-Borne Dive Bomber

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|--------------------------------------|
| 1 | Airspeed Indicator | 12 | <i>Internal System Indicator</i> |
| 2 | <i>Turn & Bank Indicator</i> | 13 | <i>Manifold Pressure</i> |
| 3 | Altimeter | 14 | <i>RPM Indicator</i> |
| 4 | <i>Artificial Horizon</i> | 15 | <i>Mixture Indicator</i> |
| 5 | <i>Clock</i> | 16 | <i>Cylinder Head Temperature</i> |
| 6 | <i>Compass</i> | 17 | <i>Landing Gear Indicator Lights</i> |
| 7 | <i>Variometer</i> | 18 | Fuel Level (Wing) |
| 8 | Compass | 19 | Fuel Level (Fuselage) |
| 9 | <i>Fuel Pressure; Oil Pressure</i> | 20 | <i>Oxygen Pressure</i> |
| 10 | <i>Oil Temperature</i> | 21 | <i>Oxygen Quantity</i> |
| 11 | <i>Pilot's Direction Indicator</i> | | |

(D3A1 continued)

Other Playable Crew Positions:



Rear Gunner

At a Glance:

Engine:

1 x Kinsei-44

Power: 1,075 HP

Advantages:

- Stable gun platform;
- Allows for precise dive bombing;
- Long range.

Armament:

- 2 x Type 97 7.7mm machine guns (forward)
- 1 x Type 92 7.7mm machine gun (rear)
- Up to 370 kg of bombs

Disadvantages:

- Poor crew protection;
- Low durability;
- Low speed.

Do-335A-0



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | |
|--|---|
| 1 Oxygen Pressure | 17 Coolant Temperature (Engine #1) |
| 2 Oxygen Flow Indicator | 18 Oil Temperature (Engine #1) |
| 3 Airspeed Indicator | 19 Fuel Pressure (Engine #1) |
| 4 Artificial Horizon & Turn & Bank Indicator | 20 Oil Pressure (Engine #1) |
| 5 Variometer | 21 Coolant Temperature (Engine #2) |
| 6 Altimeter | 22 Oil Temperature (Engine #2) |
| 7 Compass | 23 Fuel Pressure (Engine #2) |
| 8 Pilot's Direction Indicator | 24 Oil Pressure (Engine #2) |
| 9 Clock | 25 Fuel Level Warning Light |
| 10 Free Air Temperature | 26 Fuel Level |
| 11 Altitude above Ground | 27 Flap & Landing Gear Indicator Lights |
| 12 Ammunition Counters & Warning Lights | 28 Fire Warning Lights |
| 13 Prop Pitch Indicator (Engine #1) | 29 Compass |
| 14 Prop Pitch Indicator (Engine #2) | 30 Hydraulic Pressure |
| 15 RPM Indicator (Engine #1) | 31 Air Pressure |
| 16 RPM Indicator (Engine #2) | 32 Ejection Seat Pressure |

Do-335V-13



Type: Ground Attack

Major Users: Germany

Cockpit Guide:



- | | |
|--|---|
| 1 Oxygen Pressure | 17 Coolant Temperature (Engine #1) |
| 2 Oxygen Flow Indicator | 18 Oil Temperature (Engine #1) |
| 3 Airspeed Indicator | 19 Fuel Pressure (Engine #1) |
| 4 Artificial Horizon & Turn & Bank Indicator | 20 Oil Pressure (Engine #1) |
| 5 Variometer | 21 Coolant Temperature (Engine #2) |
| 6 Altimeter | 22 Oil Temperature (Engine #2) |
| 7 Compass | 23 Fuel Pressure (Engine #2) |
| 8 Pilot's Direction Indicator | 24 Oil Pressure (Engine #2) |
| 9 Clock | 25 Fuel Level Warning Light |
| 10 Free Air Temperature | 26 Fuel Level |
| 11 Altitude above Ground | 27 Flap & Landing Gear Indicator Lights |
| 12 Ammunition Counters & Warning Lights | 28 Fire Warning Lights |
| 13 Prop Pitch Indicator (Engine #1) | 29 Compass |
| 14 Prop Pitch Indicator (Engine #2) | 30 Hydraulic Pressure |
| 15 RPM Indicator (Engine #1) | 31 Air Pressure |
| 16 RPM Indicator (Engine #2) | 32 Ejection Seat Pressure |

CR.42



Type: Fighter
Cockpit Guide:

Major Users: Italy



- 1 Ammunition Counter (Left)
- 2 Manifold Pressure
- 3 Fuel Pressure
- 4 Cylinder Head Temperature
- 5 Magnetos
- 6 Oil Temperature
- 7 RPM Indicator
- 8 **Compass**
- 9 Turn & Bank Indicator

- 10 **Altimeter**
- 11 **Airspeed Indicator**
- 12 Variometer
- 13 Ammunition Counter (Right)
- 14 **Fuel Level**
- 15 Clock
- 16 Ammeter
- 17 Brake Pressure
- 18 Air Pressure

At a Glance:

Engine:

A.74 RIC38

Power: 840 HP

Advantages:

- Highly maneuverable;
- Strong rugged design,

Armament:

- 2 x 12,7-mm machine guns
- Up to 200 kg of bombs

Disadvantages:

- Low top speed;
- Weak armament.

G.50



Type: Fighter

Major Users: Italy

Cockpit Guide:



- | | |
|-----------------------------|----------------------------------|
| 1 Fuel Pressure | 13 Cylinder Head Temperature |
| 2 Oil Pressure | 14 Ammunition Counter (Left) |
| 3 RPM Indicator | 15 Compass |
| 4 Altimeter | 16 Ammunition Counter (Right) |
| 5 Airspeed Indicator | 17 Brake Pressure |
| 6 Barometric Pressure | 18 Air Pressure |
| 7 Airspeed Indicator | 19 Clock |
| 8 Turn & Bank Indicator | 20 Landing Gear Indicator Lights |
| 9 Variometer | 21 Internal System Indicator |
| 10 Oil Temperature | 22 Internal System Indicator |
| 11 Ammeter | 23 Magneto |
| 12 Fire Prevention Gauge | |

(G.50 continued)

At a Glance:

Engine:

A 74 RC 38

Power:

At sea level: 740 HP

At 3,800m: 840 HP

Advantages:

- Good structural strength;
- Excellent handling;
- Excellent maneuverability.

Armament:

- 2 x 12.7mm

Disadvantages:

- Inadequate speed;
- Insufficient armament;
- Short range;
- Not designed for winter conditions.

FW-190 A-4



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|--------------------------------------|
| 1 | Ammunition Warning Light (Left) | 12 | RPM Indicator |
| 2 | Ammunition Warning Light (Right) | 13 | Fuel Pressure; Oil Pressure |
| 3 | Ammunition Counters (Left) | 14 | Oil Temperature |
| 4 | Ammunition Counters (Right) | 15 | Fuel Level |
| 5 | Pilot's Direction Indicator | 16 | Prop Pitch Indicator |
| 6 | Airspeed Indicator | 17 | Fuel Level Warning Light |
| 7 | Artificial Horizon & Turn & Bank Indicator | 18 | Oxygen Flow Indicator |
| 8 | Variometer | 19 | Oxygen Pressure |
| 9 | Compass | 20 | Clock |
| 10 | Manifold Pressure | 21 | Flap & Landing Gear Indicator Lights |
| 11 | Altimeter | 22 | Elevator Trim Indicator |

(FW-190 continued)

At a Glance:

Engine:

801D-2.

Power:

Take-off: 1,780 HP

Armament:

- 2 x 20 mm (MG FF)
- 2 x 20 mm (MG 151)
- 2 x 7.9 mm (MG 17).

Advantages:

- Good flight characteristics;
- Powerful armament;
- Good cockpit visibility;
- Comfortable cockpit;
- Easy to fly;
- Good armor for the crew and power plant.

Disadvantages:

- Insufficient field of vision from the cockpit at taxiing.

Pilot Notes:

Take-Off Speed: 175 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto

Mixture Control: Auto

Boost: No

Supercharger: No

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- While on the Western Front the famous 190 showed itself superior to pretty much everything in the sky, on the Eastern Front it does not enjoy such a clear advantage. Most of the dogfights occur at lower altitudes where the 190 does not yet begin to shine. It should use energy tactics against most Soviet fighters, as they'll usually outturn the 190 rather easily. Its main advantage however is its phenomenal roll rate. High-speed rolling scissors rarely end in anything but a clear victory for the 190.
- 190's armament is again phenomenal. It packs a tremendous amount of firepower in its wings and any plane unlucky enough to get caught in the 190's gunsight will really feel the results. Even the Il-2's armor cannot stop the awesome power of the 190's salvo, and when firing all guns you don't even have to aim at a vulnerable spot. 190 will do its victim in no matter where it hits it.
- 190's slow speed stall characteristics can be vicious; however a gentle handling of the stick and a good eye on the airspeed indicator should keep you out of trouble.

FW-190 A-5



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|--------------------------------------|
| 1 | Ammunition Warning Light (Left) | 12 | RPM Indicator |
| 2 | Ammunition Warning Light (Right) | 13 | Fuel Pressure; Oil Pressure |
| 3 | Ammunition Counters (Left) | 14 | Oil Temperature |
| 4 | Ammunition Counters (Right) | 15 | Fuel Level |
| 5 | Pilot's Direction Indicator | 16 | Prop Pitch Indicator |
| 6 | Airspeed Indicator | 17 | Fuel Level Warning Light |
| 7 | Artificial Horizon & Turn & Bank Indicator | 18 | Oxygen Flow Indicator |
| 8 | Variometer | 19 | Oxygen Pressure |
| 9 | Compass | 20 | Clock |
| 10 | Manifold Pressure | 21 | Flap & Landing Gear Indicator Lights |
| 11 | Altimeter | 22 | Elevator Trim Indicator |

(FW-190 continued)

At a Glance:

Engine:

801D-2.

Power:

Take-off : 1,800 HP

Armament:

- 2 x 20 mm (MG 151/20).
- 2 x 7.9 mm (MG 17).

Advantages:

- Good flight characteristics;
- Powerful armament;
- Multifunctional;
- Good cockpit visibility;
- Comfortable cockpit;
- Easy to fly;
- Good armor for the crew and power plant.

Disadvantages:

- Heavier construction leading to lower speed and reduced maneuverability;
- Insufficient field of vision from the cockpit at taxiing.

Pilot Notes:

Take-Off Speed: 175 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto

Mixture Control: Auto

Boost: No

Supercharger: No

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- While on the Western Front the famous 190 showed itself superior to pretty much everything in the sky, on the Eastern Front it does not enjoy such a clear advantage. Most of the dogfights occur at lower altitudes where the 190 does not yet begin to shine. It should use energy tactics against most Soviet fighters, as they'll usually outturn the 190 rather easily. Its main advantage however is its phenomenal roll rate. High-speed rolling scissors rarely end in anything but a clear victory for the 190.
- 190's armament is again phenomenal. It packs a tremendous amount of firepower in its wings and any plane unlucky enough to get caught in the 190's gunsight will really feel the results. Even the Il-2's armor cannot stop the awesome power of the 190's salvo, and when firing all guns you don't even have to aim at a vulnerable spot. 190 will do its victim in no matter where it hits it.
- 190's slow speed stall characteristics can be vicious; however a gentle handling of the stick and a good eye on the airspeed indicator should keep you out of trouble.

FW-190 A-5 1.65 ATA



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|--------------------------------------|
| 1 | Ammunition Warning Light (Left) | 12 | RPM Indicator |
| 2 | Ammunition Warning Light (Right) | 13 | Fuel Pressure; Oil Pressure |
| 3 | Ammunition Counters (Left) | 14 | Oil Temperature |
| 4 | Ammunition Counters (Right) | 15 | Fuel Level |
| 5 | Pilot's Direction Indicator | 16 | Prop Pitch Indicator |
| 6 | Airspeed Indicator | 17 | Fuel Level Warning Light |
| 7 | Artificial Horizon & Turn & Bank Indicator | 18 | Oxygen Flow Indicator |
| 8 | Variometer | 19 | Oxygen Pressure |
| 9 | Compass | 20 | Clock |
| 10 | Manifold Pressure | 21 | Flap & Landing Gear Indicator Lights |
| 11 | Altimeter | 22 | Elevator Trim Indicator |

(FW-190 continued)

At a Glance:

Engine:

801D-2.

Power:

Take-off : 1,800 HP

Armament:

- 2 x 20 mm (MG 151/20).
- 2 x 7.9 mm (MG 17).

Advantages:

- Good flight characteristics;
- Powerful armament;
- Multifunctional;
- Good cockpit visibility;
- Comfortable cockpit;
- Easy to fly;
- Good armor for the crew and power plant.

Disadvantages:

- Heavier construction leading to lower speed and reduced maneuverability;
- Insufficient field of vision from the cockpit at taxiing.

Pilot Notes:

Take-Off Speed: 175 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto

Mixture Control: Auto

Boost: No

Supercharger: No

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- While on the Western Front the famous 190 showed itself superior to pretty much everything in the sky, on the Eastern Front it does not enjoy such a clear advantage. Most of the dogfights occur at lower altitudes where the 190 does not yet begin to shine. It should use energy tactics against most Soviet fighters, as they'll usually outturn the 190 rather easily. Its main advantage however is its phenomenal roll rate. High-speed rolling scissors rarely end in anything but a clear victory for the 190.
- 190's armament is again phenomenal. It packs a tremendous amount of firepower in its wings and any plane unlucky enough to get caught in the 190's gunsight will really feel the results. Even the Il-2's armor cannot stop the awesome power of the 190's salvo, and when firing all guns you don't even have to aim at a vulnerable spot. 190 will do its victim in no matter where it hits it.
- 190's slow speed stall characteristics can be vicious; however a gentle handling of the stick and a good eye on the airspeed indicator should keep you out of trouble.

FW-190 A-6



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|--------------------------------------|
| 1 | Ammunition Warning Light (Left) | 12 | RPM Indicator |
| 2 | Ammunition Warning Light (Right) | 13 | Fuel Pressure; Oil Pressure |
| 3 | Ammunition Counters (Left) | 14 | Oil Temperature |
| 4 | Ammunition Counters (Right) | 15 | Fuel Level |
| 5 | Pilot's Direction Indicator | 16 | Prop Pitch Indicator |
| 6 | Airspeed Indicator | 17 | Fuel Level Warning Light |
| 7 | Artificial Horizon & Turn & Bank Indicator | 18 | Oxygen Flow Indicator |
| 8 | Variometer | 19 | Oxygen Pressure |
| 9 | Compass | 20 | Clock |
| 10 | Manifold Pressure | 21 | Flap & Landing Gear Indicator Lights |
| 11 | Altimeter | 22 | Elevator Trim Indicator |

(FW-190 continued)

At a Glance:

Engine:

801D-2.

Power:

Take-off : 1,800 HP

Armament:

- 4 x 20 mm (MG 151/20).
- 2 x 7.9 mm (MG 17).

Advantages:

- Good flight characteristics;
- Powerful armament;
- Multifunctional;
- Good cockpit visibility;
- Comfortable cockpit;
- Easy to fly;
- Good armor for the crew and power plant.

Disadvantages:

- Heavier construction leading to lower speed and reduced maneuverability;
- Insufficient field of vision from the cockpit at taxiing.

Pilot Notes:

Take-Off Speed: 175 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto

Mixture Control: Auto

Boost: No

Supercharger: No

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- While on the Western Front the famous 190 showed itself superior to pretty much everything in the sky, on the Eastern Front it does not enjoy such a clear advantage. Most of the dogfights occur at lower altitudes where the 190 does not yet begin to shine. It should use energy tactics against most Soviet fighters, as they'll usually outturn the 190 rather easily. Its main advantage however is its phenomenal roll rate. High-speed rolling scissors rarely end in anything but a clear victory for the 190.
- 190's armament is again phenomenal. It packs a tremendous amount of firepower in its wings and any plane unlucky enough to get caught in the 190's gunsight will really feel the results. Even the Il-2's armor cannot stop the awesome power of the 190's salvo, and when firing all guns you don't even have to aim at a vulnerable spot. 190 will do its victim in no matter where it hits it.
- 190's slow speed stall characteristics can be vicious; however a gentle handling of the stick and a good eye on the airspeed indicator should keep you out of trouble.

FW-190 A-8



Type: Fighter-Bomber

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|--------------------------------------|
| 1 | Ammunition Counters (Left Outboard) | 13 | Fuel Pressure; Oil Pressure |
| 2 | Ammunition Counters (Left Inboard) | 14 | Oil Temperature |
| 3 | Ammunition Counters (Right Outboard) | 15 | Fuel Level |
| 4 | Ammunition Counters (Right Inboard) | 16 | Prop Pitch Indicator |
| 5 | Pilot's Direction Indicator | 17 | Fuel Level Warning Light |
| 6 | Airspeed Indicator | 18 | Oxygen Flow Indicator |
| 7 | Artificial Horizon & Turn & Bank Indicator | 19 | Oxygen Pressure |
| 8 | Variometer | 20 | Clock |
| 9 | Compass | 21 | Flap & Landing Gear Indicator Lights |
| 10 | Manifold Pressure | 22 | Elevator Trim Indicator |
| 11 | Altimeter | 23 | External Ordnance Status Lights |
| 12 | RPM Indicator | | |

(FW-190 continued)

At a Glance:

Engine:

801D-2 + MW 50.

Power:

Take-off : 1,800 HP

Armament:

- 4 x 20 mm (MG 151/20).
- 2 x 13 mm (MG 131).

Advantages:

- Good flight characteristics;
- Powerful armament;
- Multifunctional;
- Good cockpit visibility;
- Comfortable cockpit;
- Easy to fly;
- Good armor for the crew and power plant.

Disadvantages:

- Insufficient field of vision from the cockpit at taxiing.

Pilot Notes:

Take-Off Speed: 175 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto

Mixture Control: Auto

Boost: No

Supercharger: No

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- While on the Western Front the famous 190 showed itself superior to pretty much everything in the sky, on the Eastern Front it does not enjoy such a clear advantage. Most of the dogfights occur at lower altitudes where the 190 does not yet begin to shine. It should use energy tactics against most Soviet fighters, as they'll usually outturn the 190 rather easily. Its main advantage however is its phenomenal roll rate. High-speed rolling scissors rarely end in anything but a clear victory for the 190.
- 190's armament is again phenomenal. It packs a tremendous amount of firepower in its wings and any plane unlucky enough to get caught in the 190's gunsight will really feel the results. Even the Il-2's armor cannot stop the awesome power of the 190's salvo, and when firing all guns you don't even have to aim at a vulnerable spot. 190 will do its victim in no matter where it hits it.
- 190's slow speed stall characteristics can be vicious; however a gentle handling of the stick and a good eye on the airspeed indicator should keep you out of trouble.
- When used in ground attack role, 190 again is an excellent performer. It can drop bombs from level flight or in a dive; it can destroy most armored vehicles with strafing passes. 190's armor will usually protect you against enemy flak. Just keep in mind that you're not flying an IL-2, you're flying a fighter bomber – don't let yourself hang over the battlefield at 250 km/h. Speed up and stay fast during your attacks, you'll live longer.

FW-190 A-9



Type: Fighter-Bomber

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|--------------------------------------|
| 1 | Ammunition Counters (Left Outboard) | 13 | Fuel Pressure; Oil Pressure |
| 2 | Ammunition Counters (Left Inboard) | 14 | Oil Temperature |
| 3 | Ammunition Counters (Right Outboard) | 15 | Fuel Level |
| 4 | Ammunition Counters (Right Inboard) | 16 | Prop Pitch Indicator |
| 5 | Pilot's Direction Indicator | 17 | Fuel Level Warning Light |
| 6 | Airspeed Indicator | 18 | Oxygen Flow Indicator |
| 7 | Artificial Horizon & Turn & Bank Indicator | 19 | Oxygen Pressure |
| 8 | Variometer | 20 | Clock |
| 9 | Compass | 21 | Flap & Landing Gear Indicator Lights |
| 10 | Manifold Pressure | 22 | Elevator Trim Indicator |
| 11 | Altimeter | 23 | External Ordnance Status Lights |
| 12 | RPM Indicator | | |

(FW-190 continued)

At a Glance:

Engine:

801 S (TS)
or
801 E (TH)

Armament:

- 2 x 20mm (MG 151/20)
- 2 x 13mm (MG 131)
- 2 x 20mm (MG 151/20)

Advantages:

- Good flight characteristics;
- Powerful armament;
- Multifunctional;
- Good cockpit visibility;
- Comfortable cockpit;
- Easy to fly;
- Good armor for the crew and power plant;
- Improved climb rate.

Disadvantages:

- Insufficient field of vision from the cockpit at taxiing;
- Unpredictable high-G stalls.

Pilot Notes:

Take-Off Speed: 175 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto

Mixture Control: Auto

Boost: No

Supercharger: No

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- While on the Western Front the famous 190 showed itself superior to pretty much everything in the sky, on the Eastern Front it does not enjoy such a clear advantage. Most of the dogfights occur at lower altitudes where the 190 does not yet begin to shine. It should use energy tactics against most Soviet fighters, as they'll usually outturn the 190 rather easily. Its main advantage however is its phenomenal roll rate. High-speed rolling scissors rarely end in anything but a clear victory for the 190.
- 190's armament is again phenomenal. It packs a tremendous amount of firepower in its wings and any plane unlucky enough to get caught in the 190's gunsight will really feel the results. Even the Il-2's armor cannot stop the awesome power of the 190's salvo, and when firing all guns you don't even have to aim at a vulnerable spot. 190 will do its victim in no matter where it hits it.
- 190's slow speed stall characteristics can be vicious; however a gentle handling of the stick and a good eye on the airspeed indicator should keep you out of trouble.
- When used in ground attack role, 190 again is an excellent performer. It can drop bombs from level flight or in a dive; it can destroy most armored vehicles with strafing passes. 190's armor will usually protect you against enemy flak. Just keep in mind that you're not flying an IL-2, you're flying a fighter bomber – don't let yourself hang over the battlefield at 250 km/h. Speed up and stay fast during your attacks, you'll live longer.

FW-190 F-8



Type: Fighter-Bomber

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|--------------------------------------|
| 1 | Ammunition Counters (Left Outboard) | 13 | Fuel Pressure; Oil Pressure |
| 2 | Ammunition Counters (Left Inboard) | 14 | Oil Temperature |
| 3 | Ammunition Counters (Right Outboard) | 15 | Fuel Level |
| 4 | Ammunition Counters (Right Inboard) | 16 | Prop Pitch Indicator |
| 5 | Pilot's Direction Indicator | 17 | Fuel Level Warning Light |
| 6 | Airspeed Indicator | 18 | Oxygen Flow Indicator |
| 7 | Artificial Horizon & Turn & Bank Indicator | 19 | Oxygen Pressure |
| 8 | Variometer | 20 | Clock |
| 9 | Compass | 21 | Flap & Landing Gear Indicator Lights |
| 10 | Manifold Pressure | 22 | Elevator Trim Indicator |
| 11 | Altimeter | 23 | External Ordnance Status Lights |
| 12 | RPM Indicator | | |

(FW-190 continued)

At a Glance:

Engine:

801D-2
or
801 Q (801 TU)

Armament:

- 2 x 20mm (MG 151/20)
- 2 x 13mm (MG 131)

Advantages:

- Good flight characteristics;
- Powerful armament;
- Multifunctional;
- Good cockpit visibility;
- Comfortable cockpit;
- Easy to fly;
- Good armor for the crew and power plant;
- Improved climb rate.

Disadvantages:

- Insufficient field of vision from the cockpit at taxiing;
- Unpredictable high-G stalls.

Pilot Notes:

Take-Off Speed: 175 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,500 RPM

Best Cruise: 2,100 RPM

Economy Cruise: 2,000 RPM

Prop Pitch Control: Auto

Mixture Control: Auto

Boost: No

Supercharger: No

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- While on the Western Front the famous 190 showed itself superior to pretty much everything in the sky, on the Eastern Front it does not enjoy such a clear advantage. Most of the dogfights occur at lower altitudes where the 190 does not yet begin to shine. It should use energy tactics against most Soviet fighters, as they'll usually outturn the 190 rather easily. Its main advantage however is its phenomenal roll rate. High-speed rolling scissors rarely end in anything but a clear victory for the 190.
- 190's armament is again phenomenal. It packs a tremendous amount of firepower in its wings and any plane unlucky enough to get caught in the 190's gunsight will really feel the results. Even the Il-2's armor cannot stop the awesome power of the 190's salvo, and when firing all guns you don't even have to aim at a vulnerable spot. 190 will do its victim in no matter where it hits it.
- 190's slow speed stall characteristics can be vicious; however a gentle handling of the stick and a good eye on the airspeed indicator should keep you out of trouble.
- When used in ground attack role, 190 again is an excellent performer. It can drop bombs from level flight or in a dive; it can destroy most armored vehicles with strafing passes. 190's armor will usually protect you against enemy flak. Just keep in mind that you're not flying an Il-2, you're flying a fighter bomber – don't let yourself hang over the battlefield at 250 km/h. Speed up and stay fast during your attacks, you'll live longer.

FW-190 A-8 Mistel



Type: Mothership

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|---|
| 1 | Ammunition Counters (Left Outboard) | 14 | Oil Temperature |
| 2 | Ammunition Counters (Left Inboard) | 15 | Fuel Level |
| 3 | Ammunition Counters (Right Outboard) | 16 | Prop Pitch Indicator |
| 4 | Ammunition Counters (Right Inboard) | 17 | Fuel Level Warning Light |
| 5 | Pilot's Direction Indicator | 18 | Oxygen Flow Indicator |
| 6 | Airspeed Indicator | 19 | Oxygen Pressure |
| 7 | Artificial Horizon & Turn & Bank Indicator | 20 | Clock |
| 8 | Variometer | 21 | Flap & Landing Gear Indicator Lights |
| 9 | Compass | 22 | Elevator Trim Indicator |
| 10 | Manifold Pressure | 23 | Ju-88 Propeller Pitch Indicator (L & R) |
| 11 | Altimeter | 24 | Ju-88 RPM Indicator (Left) |
| 12 | RPM Indicator | 25 | Ju-88 RPM Indicator (Right) |
| 13 | Fuel Pressure; Oil Pressure | | |

(FW-190 continued)

At a Glance:

Engine:

- 1 x 801D-2 + MW 50.
- 2 x Jumo 211B-1 (converted Ju-88)

Armament:

- 4 x 20 mm (MG 151/20).
- 2 x 13 mm (MG 131).
- 3,156 kg warhead (converted Ju-88)

Advantages:

- Potential to convert obsolete medium bombers into strategic bombers;
- Large destructive power

Disadvantages:

- Insufficient field of vision from the cockpit at taxiing.
- Single-use weapon.
- Completely defenseless against enemy aircraft.

Pilot Notes:

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Mistel aircraft is a very peculiar bird which presented our team with some unique challenges. The modified Ju-88 strapped to the flyable FW-190 is really a one of a kind object in the game. As such, our AI routine would need a complete overwrite to allow for complete realistic Mistel operations. Unfortunately we could not afford to spend another year doing that, so our AI Mistels cannot take-off, land or attack targets. The most an AI Mistel can do is follow a set of waypoints in the air, basically serving as a large target for other flights.
- Another important limitation is that Mistels cannot be flown in online dogfight games; however they can be flown in co-op missions.
- Player-controlled Mistels however do work like other planes. You can start on the ground and take-off in them, land with or without the attached Ju-88 bomb, and detach the Ju-88 bomb in the air and launch it at targets. You must launch the Mistel at least from 1 km away from the target; historically they were launched from even farther away. Just lower your engine power to about 33% of throttle, hold your target in the crosshairs for a few seconds and press the "*Attach/Detach Aircraft*" button to separate from the Ju-88. It will follow on your current course, while you should try to get away from the target area. The Mistel's blast is pretty big, and it will damage or destroy objects on the ground and in the air in a very large radius.
- Creating a mission with a Mistel is easy: just create two waypoints for the Ju-88 (Mistel), then place waypoints for the FW-190A-8 (Mistel). With the FW-190 selected, go to the Waypoint tab of the Object window, click the Set button and click on the Mistel. This will link the two in the beginning of the mission.
- You can set the first waypoint of the pair to be Take-Off, but AI flown Mistels will not be able to take-off.
- When releasing the Mistel from low altitudes and at a shallow angle, it may hit the ground without exploding. Its detonator was located in the tip of its long nose, so if the Mistel hits the ground with its fuselage without an impact on the nose it will not detonate.
- Combat/take off/landing flaps will only work on the Fw-190 and not extend on the Ju-88.
- When the Mistel hits the ground you may sometimes hear the "I'm hit, I am going down" radio call.

FW-190 D-9 1944



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|--------------------------------------|
| 1 | Ammunition Counters (Left Outboard) | 12 | RPM Indicator |
| 2 | Ammunition Counters (Left Inboard) | 13 | Fuel Pressure; Oil Pressure |
| 3 | Ammunition Counters (Right Outboard) | 14 | Oil Temperature |
| 4 | Ammunition Counters (Right Inboard) | 15 | Coolant Temperature |
| 5 | Pilot's Direction Indicator | 16 | Fuel Level |
| 6 | Airspeed Indicator | 17 | Fuel Level Warning Light |
| 7 | Artificial Horizon & Turn & Bank Indicator | 18 | Oxygen Flow Indicator |
| 8 | Variometer | 19 | Oxygen Pressure |
| 9 | Compass | 20 | Clock |
| 10 | Manifold Pressure | 21 | Elevator Trim Indicator |
| 11 | Altimeter | 22 | Flap & Landing Gear Indicator Lights |

(FW-190 continued)

At a Glance:

Engine:

Ju 213A-1 + MW 50.

Power:

Indicated: 1,200 HP

Take-off : 1,776 HP

With MW 50: 2,240 HP

Armament:

- 2 x 20 mm (MG 151/20).
- 2 x 13 mm (MG 131).

Advantages:

- Excellent flight characteristics;
- Powerful armament;
- Multifunctional;
- Good cockpit visibility;
- Comfortable cockpit;
- Easy to fly;
- Good armor for the crew and power plant.

Disadvantages:

- Low maneuverability

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,600 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Auto/Manual

Mixture Control: Auto

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The FW-190D-9, the long-nosed 190, is the ultimate version of what many consider to be the best fighter of WWII. It really is an excellent all-around fighter with great performance characteristics and easy handling. In capable hands it will defeat any other fighter of the war. The only planes that can give it trouble are the La-7 and Yak-3 or 9, which can gain an upper hand in low-altitude turning engagements. However at higher altitudes and higher airspeeds FW-190D-9 is any fighter pilot's dream.
- Its four cannon armament is brutal against all enemy planes. Be aware that your 20mms are located in the wings; therefore convergence should become a concern. An accurate burst at a convergence distance will cause pretty much anything to instantly go down.

FW-190 D-9 1945



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|--------------------------------------|
| 1 | Ammunition Counters (Left Outboard) | 13 | Fuel Pressure; Oil Pressure |
| 2 | Ammunition Counters (Left Inboard) | 14 | Oil Temperature |
| 3 | Ammunition Counters (Right Outboard) | 15 | Coolant Temperature |
| 4 | Ammunition Counters (Right Inboard) | 16 | MW-50 Pressure |
| 5 | Pilot's Direction Indicator | 17 | Fuel Level |
| 6 | Airspeed Indicator | 18 | Fuel Level Warning Light |
| 7 | Artificial Horizon & Turn & Bank Indicator | 19 | Oxygen Flow Indicator |
| 8 | Variometer | 20 | Oxygen Pressure |
| 9 | Compass | 21 | Clock |
| 10 | Manifold Pressure | 22 | Elevator Trim Indicator |
| 11 | Altimeter | 23 | Flap & Landing Gear Indicator Lights |
| 12 | RPM Indicator | | |

(FW-190 continued)

At a Glance:

Engine:

Ju 213A-1 + MW 50.

Power:

Indicated: 1,200 HP

Take-off : 1,776 HP

With MW 50: 2,240 HP

Armament:

- 2 x 20 mm (MG 151/20).
- 2 x 13 mm (MG 131).

Advantages:

- Excellent flight characteristics;
- Powerful armament;
- Multifunctional;
- Good cockpit visibility;
- Comfortable cockpit;
- Easy to fly;
- Good armor for the crew and power plant.

Disadvantages:

- Low maneuverability

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,600 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Auto/Manual

Mixture Control: Auto

Boost: No

Supercharger: Auto

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The FW-190D-9, the long-nosed 190, is the ultimate version of what many consider to be the best fighter of WWII. It really is an excellent all-around fighter with great performance characteristics and easy handling. In capable hands it will defeat any other fighter of the war. The only planes that can give it trouble are the La-7 and Yak-3 or 9, which can gain an upper hand in low-altitude turning engagements. However at higher altitudes and higher airspeeds FW-190D-9 is any fighter pilot's dream.
- Its four cannon armament is brutal against all enemy planes. Be aware that your 20mms are located in the wings; therefore convergence should become a concern. An accurate burst at a convergence distance will cause pretty much anything to instantly go down.

Ta-152H-1



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|--------------------------------------|
| 1 | Ammunition Counters (Left Outboard) | 13 | Fuel Pressure; Oil Pressure |
| 2 | Ammunition Counters (Left Inboard) | 14 | Oil Temperature |
| 3 | Ammunition Counters (Right Outboard) | 15 | Coolant Temperature |
| 4 | Ammunition Counters (Right Inboard) | 16 | MW-50 Pressure |
| 5 | Pilot's Direction Indicator | 17 | Fuel Level |
| 6 | Airspeed Indicator | 18 | Fuel Level Warning Light |
| 7 | Artificial Horizon & Turn & Bank Indicator | 19 | Oxygen Flow Indicator |
| 8 | Variometer | 20 | Oxygen Pressure |
| 9 | Compass | 21 | Clock |
| 10 | Manifold Pressure | 22 | Elevator Trim Indicator |
| 11 | Altimeter | 23 | Flap & Landing Gear Indicator Lights |
| 12 | RPM Indicator | | |

(Ta-152 continued)

At a Glance:

Engine:

1 x Jumo-213 x -1

Power:

Take-off: 2,050 HP

Indicated: 1,870 HP

Armament:

- 2 x 20-mm MG-151/20 cannon
- 1 x 30-mm MK 108 cannon

Advantages:

- Excellent speed for a piston engine fighter;
- Good climb rate;
- Powerful armament.

Disadvantages:

- As the plane was designed for high altitude combat, its low altitude performance was less than stellar.

Pilot Notes:

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- This plane has two systems of engine boost: GM-1 for high altitudes and MW-50 for low altitudes.
- GM-1 should be used at altitudes above 9,000 m
- If you reach that altitude with the MW-50 Off, you can turn on the GM-1 by hitting W button (default).
- If you reach that altitude with the MW-50 enabled, then you need to switch it off by hitting W and then press W again to engage the GM-1.
- Below 9,000 m the W key operated only the MW-50 as normal.
- If the GM-1 was engaged at a high altitude and was not disengaged below 9,000 meters, then the engine will not be damaged as on DB-605s; however no extra power will be gained from the device. This is historically correct.

Ta-152C



Type: Fighter

Major Users: Germany

Cockpit Guide:



- | | |
|--|---|
| 1 Ammunition Counters (Left Outboard) | 13 Fuel Pressure; Oil Pressure |
| 2 Ammunition Counters (Left Inboard) | 14 Oil Temperature |
| 3 Ammunition Counters (Right Outboard) | 15 Coolant Temperature |
| 4 Ammunition Counters (Right Inboard) | 16 MW-50 Pressure |
| 5 Pilot's Direction Indicator | 17 Fuel Level |
| 6 Airspeed Indicator | 18 Fuel Level Warning Light |
| 7 Artificial Horizon & Turn & Bank Indicator | 19 Oxygen Flow Indicator |
| 8 Variometer | 20 Oxygen Pressure |
| 9 Compass | 21 Clock |
| 10 Manifold Pressure | 22 Elevator Trim Indicator |
| 11 Altimeter | 23 Flap & Landing Gear Indicator Lights |
| 12 RPM Indicator | |

(Ta-152 continued)

At a Glance:

Engine:

1 x DB-603L

Armament:

- 2 x 20-mm MG-151/20 cannon
- 1 x 30-mm MK 108 cannon

Advantages:

- Excellent speed for a piston engine fighter;
- Good climb rate;
- Powerful armament.

Disadvantages:

- As the plane was designed for high altitude combat, its low altitude performance was less than stellar.

Pilot Notes:

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- This plane has two systems of engine boost: GM-1 for high altitudes and MW-50 for low altitudes.
- GM-1 should be used at altitudes above 9,000 m
- If you reach that altitude with the MW-50 Off, you can turn on the GM-1 by hitting W button (default).
- If you reach that altitude with the MW-50 enabled, then you need to switch it off by hitting W and then press W again to engage the GM-1.
- Below 9,000 m the W key operated only the MW-50 as normal.
- If the GM-1 was engaged at a high altitude and was not disengaged below 9,000 meters, then the engine will not be damaged as on DB-605s; however no extra power will be gained from the device. This is historically correct.
- Ta-152C, and potentially some other Luft'46 planes modeled in our sim were projected to use the EZ42 gyro sight, similar to the K-14 "ace-maker" used in late-war American planes. However no detailed information about the features of the EZ42 exist, and we were forced to "install" regular sights on these planes. Even in the cockpits with 3D models visually based on the EZ42 design, they function as simple reflector sights.

G4M1-11



Type: Bomber
Cockpit Guide:

Major Users: Japan



- | | | | |
|----|---|----|---|
| 1 | Variometer | 21 | Airspeed Indicator |
| 2 | Turn & Bank Indicator | 22 | Turn & Bank Indicator |
| 3 | Airspeed Indicator | 23 | Altimeter |
| 4 | Artificial Horizon | 24 | Manifold Pressure (Engine #1) |
| 5 | Compass | 25 | Manifold Pressure (Engine #2) |
| 6 | Altimeter | 26 | RPM Indicator (Engine #1) |
| 7 | Inclinometer | 27 | RPM Indicator (Engine #2) |
| 8 | Flap Position Indicator | 28 | Exhaust Temperature (Engine #1) |
| 9 | Internal System Indicator | 29 | Exhaust Temperature (Engine #2) |
| 10 | Free Air Temperature (Left) | 30 | Fuel Pressure; Oil Pressure (Engine #1) |
| 11 | Free Air Temperature (Right) | 31 | Fuel Pressure; Oil Pressure (Engine #2) |
| 12 | Flap Ind. & Landing Gear Indicator Lights | 32 | Cylinder Head Temperature (Engine #1) |
| 13 | Pilot's Direction Indicator | 33 | Cylinder Head Temperature (Engine #2) |
| 14 | Compass | 34 | Oil Temperature (Engine #1) |
| 15 | Compass | 35 | Oil Temperature (Engine #2) |
| 16 | Artificial Horizon | 36 | Fuel Level (Right Outboard) |
| 17 | Compass & Bank Indicator | 37 | Fuel Level (Right Inboard) |
| 18 | Autopilot Status Indicator | 38 | Fuel Level (Fuselage) |
| 19 | Voltmeter | 39 | Fuel Level (Left Inboard) |
| 20 | Clock | 40 | Fuel Level (Left Outboard) |

(G4M continued)

Other Playable Crew Positions:



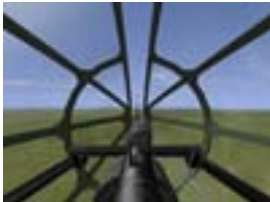
Bombardier



Nose Gunner



Top Gunner



Tail Gunner



Waist Gunners (L + R)

At a Glance:

Engine:

2 x MK4A Kasei 11

Power: 2 x 1,530 HP

Armament:

- 4 x Type 92 7.7mm machine guns
- 1 x Type 99 20mm cannon
- Up to 800kg of bombs

Advantages:

- Easy to fly;
- Reliable;
- Excellent defensive coverage;
- Multifunctional.

Disadvantages:

- Poor damage threshold;
- Low bomb load.

Pilot Notes:

- Switch supercharger speeds at 3,000 meters (9,840 feet)
- The Betty is a very fragile aircraft, so try not to get hit too much.
- Unlike most other bombers with only machine guns for defensive armament, the Betty has a 20mm cannon in the tail. It is absolutely devastating. If any enemy fighters are foolish enough to attack you from behind, use it to your advantage.

(G4M continued)

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Then the sight will automatically track the target, and drop the bombs automatically at the right time.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to acquire the target with the bombsight crosshair. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle up, and scan the horizon for the mission target.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course. Then using the *Increase Bombsight Distance* and *Decrease Bombsight Distance* keys place the crosshair on target. With the target dead center, turn on the targeting computer using the *Toggle Bombsight Automation* key. The bombsight will begin tracking the target. Correct the crosshair movement with the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys if necessary.
- The bombs will drop automatically when the plane reaches the proper position for a bomb drop, based on the input parameters and the optics angle.
- Note that after starting the bomb run, a plane may not be banked more than 4.5 degrees or the bombsight will lose stability. Only slight adjustments in direction are allowed. After more substantial maneuvers the bomb sight may take up to 30 seconds to stabilize. During the stabilization phase, the bomb sight crosshairs are turned off.

Go-229A-1



Type: Jet Fighter - Bomber

Major Users: Germany

Cockpit Guide:



- | | | | |
|---|--|----|---------------------------------|
| 1 | Variometer | 10 | RPM Indicator (Engine #2) |
| 2 | Artificial Horizon & Turn & Bank Indicator | 11 | Oil Pressure (Engine #1) |
| 3 | Airspeed Indicator | 12 | Exhaust Temperature (Engine #1) |
| 4 | Altimeter | 13 | Exhaust Temperature (Engine #2) |
| 5 | Compass | 14 | Oil Pressure (Engine #2) |
| 6 | Pilot's Direction Indicator | 15 | Free Air Temperature |
| 7 | Fuel Level (Left) | 16 | Oxygen Pressure |
| 8 | Fuel Level (Right) | 17 | Oxygen Flow Indicator |
| 9 | RPM Indicator (Engine #1) | | |

(Go-229 continued)

At a Glance:

Engine:

2 x Jumo 109-004B
Thrust: 890 kgc

Armament:

- 4 x 30-mm MK 108 cannon
- 1,000 kg of bombs

Advantages:

- High ceiling;
- High airspeed and climb rate;
- Powerful armament.

Disadvantages:

- Low stability;
- Poor maneuverability;
- Poor cockpit visibility;
- Difficult to land;
- Large for a fighter.

Pilot Notes:

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The Go-229 is equipped with an ejection seat. However these are not modern 0-0 ejection seats, and you have a very low chance of survival punching out below 500 meters of altitude or stationary on the ground.
- Go-229 is modeled without the historically optional drag chute; you must brake with only wheel brakes as on other planes.
- We have also modeled small air brakes on this aircraft used for low speed stability and for spin recovery.

He-111H-2



Type: Bomber
Cockpit Guide:

Major Users: Germany



- | | | | |
|----|---------------------------------|----|---|
| 1 | Artificial Horizon | 19 | Oil Pressure; Fuel Pressure (Engine #1) |
| 2 | Homing Beacon Indicator | 20 | Oil Pressure; Fuel Pressure (Engine #2) |
| 3 | Pilot's Direction Indicator | 21 | Clock |
| 4 | Airspeed Indicator | 22 | Prop Pitch Indicator (Engine #1) |
| 5 | Compass | 23 | Prop Pitch Indicator (Engine #2) |
| 6 | RPM Indicator (Engine #1) | 24 | Flap Position Indicator |
| 7 | RPM Indicator (Engine #2) | 25 | Landing Gear Indicator Lights |
| 8 | Turn & Bank Indicator | 26 | Patin compass |
| 9 | Variometer | 27 | Fuel Selector Switch (Left) |
| 10 | Altimeter | 28 | Fuel Level Warning Light (Left) |
| 11 | Compass | 29 | Fuel Level (Left) |
| 12 | Bank Indicator | 30 | Fuel Level (Right) |
| 13 | Manifold Pressure (Engine #1) | 31 | Fuel Level Warning Light (Right) |
| 14 | Manifold Pressure (Engine #2) | 32 | Fuel Selector Switch (Right) |
| 15 | Oil Temperature (Engine #1) | 33 | Oil Pressure; Fuel Pressure (Engine #1) |
| 16 | Oil Temperature (Engine #2) | 34 | Free Air Temperature |
| 17 | Coolant Temperature (Engine #1) | 35 | Oil Pressure; Fuel Pressure (Engine #2) |
| 18 | Coolant Temperature (Engine #2) | 36 | Instrument Dimmer Switch |

(He-111 continued)

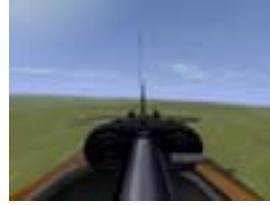
Other Playable Crew Positions:



Bombardier



Nose Gunner



Top Gunner



Bottom Gunner



Waist Gunners (L + R)

At a Glance:

Engine:

2 x Jumo211A-3.

Power:

Take-off : 1,100 HP

Advantages:

- High flight characteristics;
- Good field of vision from the cockpit;
- Multifunctional;
- Good range.

Armament:

- 5 x 7.92 mm (MG 15).
- Up to 2,000 kg of bombs.

Disadvantages:

- Low speed;
- Low service ceiling.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,600 RPM

Best Cruise: 2,200 RPM

Economy Cruise: 2,100 RPM

Prop Pitch Control: Manual

Mixture Control: No

Boost: No

Supercharger: Two Speed

- He-111 is a good German bomber that however started to become obsolete by mid-1943. By 1944 it really becomes very vulnerable to enemy fighters and should not be used in high-threat environments.
- He-111's excellent bombsight gives you a wide window of opportunity in choosing your target altitude and airspeed. You can attack at 50 meters above ground and 450 km/h, or 4,000 meters and 250 km/h. It's best however to fly faster in the areas protected with flak as He-111 is not very well armored.
- The engines are not equipped with fire extinguishers, so once an engine catches fire you should immediately turn it off and feather the prop. If one of the fuel tank catches fire an explosion is imminent and you should bail out immediately.
- He-111 can fly on land normally even on one engine, so if you successfully shut one down after receiving battle damage you should jettison your bombload and proceed back home.

Please refer to the in-game training missions for information on flying and fighting in the He-111.

(He-111 continued)

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Then the sight will automatically track the target, and drop the bombs automatically at the right time.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to acquire the target with the bombsight crosshair. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle up, and scan the horizon for the mission target.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course. Then using the *Increase Bombsight Distance* and *Decrease Bombsight Distance* keys place the crosshair on target. With the target dead center, turn on the targeting computer using the *Toggle Bombsight Automation* key. The bombsight will begin tracking the target. Correct the crosshair movement with the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys if necessary.
- The bombs will drop automatically when the plane reaches the proper position for a bomb drop, based on the input parameters and the optics angle.
- Note that after starting the bomb run, a plane may not be banked more than 4.5 degrees or the bombsight will lose stability. Only slight adjustments in direction are allowed. After more substantial maneuvers the bomb sight may take up to 30 seconds to stabilize. During the stabilization phase, the bomb sight crosshairs are turned off.

He-111H-6



Type: Bomber

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|---------------------------------|----|---|
| 1 | Artificial Horizon | 19 | Oil Pressure; Fuel Pressure (Engine #1) |
| 2 | Homing Beacon Indicator | 20 | Oil Pressure; Fuel Pressure (Engine #2) |
| 3 | Pilot's Direction Indicator | 21 | Clock |
| 4 | Airspeed Indicator | 22 | Prop Pitch Indicator (Engine #1) |
| 5 | Compass | 23 | Prop Pitch Indicator (Engine #2) |
| 6 | RPM Indicator (Engine #1) | 24 | Flap Position Indicator |
| 7 | RPM Indicator (Engine #2) | 25 | Landing Gear Indicator Lights |
| 8 | Turn & Bank Indicator | 26 | Patin compass |
| 9 | Variometer | 27 | Fuel Selector Switch (Left) |
| 10 | Altimeter | 28 | Fuel Level Warning Light (Left) |
| 11 | Compass | 29 | Fuel Level (Left) |
| 12 | Bank Indicator | 30 | Fuel Level (Right) |
| 13 | Manifold Pressure (Engine #1) | 31 | Fuel Level Warning Light (Right) |
| 14 | Manifold Pressure (Engine #2) | 32 | Fuel Selector Switch (Right) |
| 15 | Oil Temperature (Engine #1) | 33 | Oil Pressure; Fuel Pressure (Engine #1) |
| 16 | Oil Temperature (Engine #2) | 34 | Free Air Temperature |
| 17 | Coolant Temperature (Engine #1) | 35 | Oil Pressure; Fuel Pressure (Engine #2) |
| 18 | Coolant Temperature (Engine #2) | 36 | Instrument Dimmer Switch |

(He-111 continued)

Other Playable Crew Positions:



Bombardier



Nose Gunner



Top Gunner



Bottom Gunner



Waist Gunners (L + R)

At a Glance:

Engine:

2 x Jumo211F-1

Power: 2 x 1,350 HP

Advantages:

- High flight characteristics;
- Good field of vision from the cockpit;
- Multifunctional;
- Good range.

Armament:

- 5 x 7.92mm (MG 15)
- 1 x 20mm (MG/FF)
- Up to 2,000 kg of bombs or torpedoes.

Disadvantages:

- Low speed;
- Low service ceiling.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 150 km/h

Combat Engine Setting: 2,600 RPM

Best Cruise: 2,200 RPM

Economy Cruise: 2,100 RPM

Prop Pitch Control: Manual

Mixture Control: No

Boost: No

Supercharger: Two Speed

- He-111 is a good German bomber that however started to become obsolete by mid-1943. By 1944 it really becomes very vulnerable to enemy fighters and should not be used in high-threat environments.
- He-111's excellent bombsight gives you a wide window of opportunity in choosing your target altitude and airspeed. You can attack at 50 meters above ground and 450 km/h, or 4,000 meters and 250 km/h. It's best however to fly faster in the areas protected with flak as He-111 is not very well armored.
- The engines are not equipped with fire extinguishers, so once an engine catches fire you should immediately turn it off and feather the prop. If one of the fuel tank catches fire an explosion is imminent and you should bail out immediately.
- He-111 can fly on land normally even on one engine, so if you successfully shut one down after receiving battle damage you should jettison your bombload and proceed back home. Please refer to the in-game training missions for information on flying and fighting in the He-111.

(He-111 continued)

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Then the sight will automatically track the target, and drop the bombs automatically at the right time.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to acquire the target with the bombsight crosshair. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle up, and scan the horizon for the mission target.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course. Then using the *Increase Bombsight Distance* and *Decrease Bombsight Distance* keys place the crosshair on target. With the target dead center, turn on the targeting computer using the *Toggle Bombsight Automation* key. The bombsight will begin tracking the target. Correct the crosshair movement with the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys if necessary.
- The bombs will drop automatically when the plane reaches the proper position for a bomb drop, based on the input parameters and the optics angle.
- Note that after starting the bomb run, a plane may not be banked more than 4.5 degrees or the bombsight will lose stability. Only slight adjustments in direction are allowed. After more substantial maneuvers the bomb sight may take up to 30 seconds to stabilize. During the stabilization phase, the bomb sight crosshairs are turned off.

He-162A-2



Type: Jet Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|---|-----------------------------|----|---------------------|
| 1 | Turn & Bank Indicator | 8 | Oil Pressure |
| 2 | Airspeed Indicator | 9 | Fuel Level |
| 3 | Variometer | 10 | Clock |
| 4 | Pilot's Direction Indicator | 11 | Fuel Pressure |
| 5 | Altimeter | 12 | RPM Indicator |
| 6 | Compass | 13 | Ammunition Counters |
| 7 | Exhaust Temperature | 14 | Oxygen Pressure |

(He-162 continued)

At a Glance:

Engine:

1 x 003

Armament:

- 2 x 20mm (MG 151) cannon

Advantages:

- Fastest operational fighter of WWII;
- Excellent performance characteristics;
- Good maneuverability;
- Strong armament;
- Good cockpit visibility.

Disadvantages:

- Manufacturing defects;
- High control sensitivity.

Pilot Notes:

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the ***Toggle Gunsight*** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The He-162 is equipped with an ejection seat. However these are not modern 0-0 ejection seats, and you have a very low chance of survival punching out below 500 meters of altitude or stationary on the ground.

He-162C



Type: Jet Fighter

Major Users: Germany

Cockpit Guide:



- 1 Turn & Bank Indicator
- 2 **Airspeed Indicator**
- 3 Variometer
- 4 Pilot's Direction Indicator
- 5 **Altimeter**
- 6 **Compass**
- 7 Exhaust Temperature

- 8 Oil Pressure
- 9 **Fuel Level**
- 10 Clock
- 11 Fuel Pressure
- 12 RPM Indicator
- 13 Ammunition Counters
- 14 Oxygen Pressure

At a Glance:

Engine:

1 x 011A turbojet

Power: 1,300 kg/s

Armament:

- 2 x 30mm MK-108 cannon

Advantages:

- Excellent performance;
- Strong armament;
- Cheap and easy to produce.

Disadvantages:

- Never entered production.

(He-162 continued)

Pilot Notes:

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- The He-162 is equipped with an ejection seat. However these are not modern 0-0 ejection seats, and you have a very low chance of survival punching out below 500 meters of altitude or stationary on the ground.

He-162D



Type: Jet Fighter

Major Users: Germany

Cockpit Guide:



- 1 Turn & Bank Indicator
- 2 **Airspeed Indicator**
- 3 Variometer
- 4 Pilot's Direction Indicator
- 5 **Altimeter**
- 6 **Compass**
- 7 Exhaust Temperature

- 8 Oil Pressure
- 9 **Fuel Level**
- 10 Clock
- 11 Fuel Pressure
- 12 RPM Indicator
- 13 Ammunition Counters
- 14 Oxygen Pressure

At a Glance:

Engine:

1 x 011A turbojet

Power: 1,300 kg/s

Armament:

- 2 x 30mm MK-108 cannon

Advantages:

- Excellent performance;
- Strong armament;
- Cheap and easy to produce.

Disadvantages:

- Questionable forward-swept wing;
- Never entered production.

(He-162 continued)

Pilot Notes:

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the **Toggle Gunsight** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- A forward-swept wing is well known to hold several advantages over a straight wing, such as better laminar flow, better maneuverability, etc. However not a single forward-swept wing project has entered serial production. The reason is simple: wing flutter begins much earlier with this wing than with other types. No counter-balances can solve this problem; even the common design decision of placing the engine gondolas forward can fully solve this. The decision only became possible with introduction of super-strong composite materials in the aviation industry.
- Therefore, we've made a concession that the He-162D's wing is also made of such composite materials, which would have historically been unavailable in 1945-46.
- The He-162 is equipped with an ejection seat. However these are not modern 0-0 ejection seats, and you have a very low chance of survival punching out below 500 meters of altitude or stationary on the ground.

Lerche III B-2



Type: VTOL Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|---|--|----|------------------------------------|
| 1 | Artificial Horizon & Turn & Bank Indicator | 7 | Oil Pressure (Engine #2) |
| 2 | Airspeed Indicator | 8 | RPM Indicator (Engine #1) |
| 3 | Altimeter | 9 | RPM Indicator (Engine #1) |
| 4 | Coolant Temperature (Engine #1) | 10 | Stabilizer System Indicator Lights |
| 5 | Oil Pressure (Engine #1) | 11 | Fuel Level |
| 6 | Coolant Temperature (Engine #2) | 12 | Variometer |

(Lerche continued)

Pilot Notes:

- The aircraft is quipped with automatic stabilization auto-pilot that keeps the aircraft vertical during take-off and landing. The system is toggled with the “*Airbrake*” key. The white indicator lights on the instrument panel illuminate when the system is switched on.
- Unlike most other fighters, the “*Toggle Gunsight*” button (Shift-F1 by default) switches the view to point downwards, at the instrument panel and the ground below.
- Take-off procedure in the aircraft is simple. Toggle the stabilization auto-pilot on and slowly increase engine power. Reaching 200-300 meters of altitude push the nose down slowly to convert to horizontal flight, and disengage the stabilization auto-pilot.
- The landing procedure is more involved. Firstly, select suitable area for landing. Landing approach is standard, with speeds of around 250-300 km/h, with the stabilization auto-pilot turned on (one white indicator light). At 25-30 meters of altitude begin a flare at 10 to 20 degrees nose-up attitude. The active stabilization auto-pilot will engage (second white indicator light). Level the elevators at that time. The stabilization auto-pilot will attempt to keep the aircraft vertical. Do not increase engine power at this time, as this may cause too much altitude to be gained. Do not chop the throttle below 25%, as this may lead to a stall or loss of effectiveness of the gas-powered stabilization mechanism.
- After the aircraft is stabilized vertically, slowly decrease power to descent. Aircraft with expanded ammunition and low fuel will hover at approximately 35 to 40% of throttle. When descending, vertical speed of no more than 5 m/s is recommended. The aircraft is also equipped with ultra-sound altimeter, which should be used alongside the vertical speed indicator during descent.
- Before touch-down decrease the vertical speed, momentarily opening the throttle. When the aircraft touches down, three green lights will illuminate on the dashboard. Immediately decrease power to avoid bunny-hopping.
- When using auto-pilot, or performed by AI planes, the landing may not look smooth due to inherent game engine limitations.
- The **X-4** air-to-air rocket is wire guided. All rocket-carrying aircraft have a single rocket control module, and as such can guide only one rocket at a time. When launching multiple rockets simultaneously, only the last rocket fired can be guided.
- To guide the rocket, use the “*Increase Sight Attitude*”, “*Decrease Sight Attitude*”, “*Adjust Sight Control to Right*” and “*Adjust Sight Control to Left*” keys. We recommend assigning them to the Up, Down, Right, and Left arrow keys correspondingly.
- The easiest way to guide the rocket to target is to fire from the target's six-o-clock level while flying on the same course. Guide the rocket to keep the lights on top of the target with no visible lateral movement until the moment of impact. Use gentle taps to provide last-minute guidance. The rockets detonate remotely, so no direct impact is required.
- This method should be used to attack non-maneuvering heavy bombers from 3,000 to 3,500 meters away.
- NOTE: The guiding wire is not visually modeled.

Hurricane Mk I



Type: Fighter

Major Users: Finland; RAF; USSR

Cockpit Guide:



- 1 Landing Gear Position Indicator
- 2 Engine Temperature Warning Light
- 3 RPM Indicator
- 4 Oxygen Altitude
- 5 Oxygen Quantity
- 6 **Airspeed Indicator**
- 7 Artificial Horizon
- 8 Variometer
- 9 **Altimeter**

- 10 **Compass**
- 11 Turn & Bank Indicator
- 12 Manifold Pressure
- 13 Oil Pressure
- 14 Fuel Pressure
- 15 **Fuel Level**
- 16 Oil Temperature
- 17 Radiator Temperature

(Hurricane continued)

At a Glance:

Engine:

1 x XX

Power:

Indicated: 950 HP

Take-off: 1,280 HP

Armament:

- 12 x.303 machine guns

Advantages:

- Simple to control;
- Easy to maintain in field conditions;
- Reliable and stable in flight.

Disadvantages:

- Insufficient cockpit visibility;
- Inferior to contemporary enemy fighters.

Pilot Notes:

Take-Off Speed: 150 km/h / 85 kts

Landing Speed: 145 km/h / 80 kts

Combat Engine Setting: 3,000 RPM

Best Cruise: 2,650 RPM

Economy Cruise: 2,500 RPM

Prop Pitch Control: Manual

Mixture Control: Manual

Boost: No

Supercharger: Two-Speed

- The Hurricane Mk I as modeled in the sim is the version used by the Finnish Air Force, mainly against the Soviet Union; which is why it appears in the Blue / Axis list.
- Hurricane is generally inferior to all 1941 fighters, and inadequate against all 1942 and later fighters. It is mostly effective against bombers or as a ground attack plane.
- Hurricane has regretful acceleration and dive characteristics, therefore should generally be used in horizontal combat.
- Be aware that all instrumentation in the Hurricane is not metric but imperial, therefore you will need to learn to convert feet to meters and mile to kilometers when flying on instruments.
Hurricane is a rather stable gunnery platform with armament sufficient to bring down any target at ranges under 300 meters.
- Supercharger speeds should be set to speed 2 in combat or in climb if boost is 2-5 psi below max; otherwise use speed 1.
- Best performance altitude is between 1,500 and 2,800 meters for speed 1 and 4,500 and 6,500 for speed 2.
- Worst performance between 3,000 and 4,500 meters

I.A.R. 80



Type: Fighter

Major Users: Romania

Cockpit Guide:



- | | | | |
|----|-------------------------------|----|---------------------------|
| 1 | Altimeter | 11 | Manifold Pressure |
| 2 | Directional Gyro | 12 | RPM Indicator |
| 3 | Clock | 13 | Fire Extinguisher Status |
| 4 | Airspeed Indicator | 14 | Ammeter |
| 5 | Turn & Bank Indicator | 15 | Fuel Level |
| 6 | Variometer | 16 | Internal System Indicator |
| 7 | Landing Gear Indicator Lights | 17 | Internal System Indicator |
| 8 | Prop Pitch Indicator | 18 | Pump Pressure |
| 9 | Oil Pressure; Fuel Pressure | 19 | Air Pressure |
| 10 | Oil Temperature | 20 | Brake Pressure |

(IAR 80 continued)

At a Glance:

Engine:

I.A.R. K.14-1000A.

Power: 1,025 HP

Armament:

- 4 x 7.62 mm (FN).

Advantages:

- Excellent performance characteristics;
- Excellent maneuverability;
- Strong armament;
- Good cockpit visibility;
- Easy to fly.

Disadvantages:

- Low speed.

I.A.R. 81a



Type: Fighter-Bomber

Major Users: Romania

Cockpit Guide:



- | | | | |
|----|-------------------------------|----|---------------------------|
| 1 | Landing Gear Indicator Lights | 11 | Manifold Pressure |
| 2 | Clock | 12 | RPM Indicator |
| 3 | Altimeter | 13 | Fire Extinguisher Status |
| 4 | Directional Gyro | 14 | Ammeter |
| 5 | Airspeed Indicator | 15 | Fuel Level |
| 6 | Turn & Bank Indicator | 16 | Internal System Indicator |
| 7 | Variometer | 17 | Internal System Indicator |
| 8 | Prop Pitch Indicator | 18 | Pump Pressure |
| 9 | Oil Pressure; Fuel Pressure | 19 | Air Pressure |
| 10 | Oil Temperature | 20 | Brake Pressure |

(IAR 80 continued)

At a Glance:

Engine:

I.A.R. K.14-1000A.

Power: 1,025 HP

Armament:

- 4 x 7.62 mm (FN).
- 2 x 13 mm (MG 131).
- Up to 250 kg of bombs.

Advantages:

- Excellent performance characteristics;
- Excellent maneuverability;
- Strong armament;
- Good cockpit visibility;
- Easy to fly.

Disadvantages:

- Low speed.

I.A.R. 81c



Type: Fighter-Bomber

Major Users: Romania

Cockpit Guide:



- | | | | |
|----|-------------------------------|----|---------------------------|
| 1 | Landing Gear Indicator Lights | 11 | Manifold Pressure |
| 2 | Clock | 12 | RPM Indicator |
| 3 | Altimeter | 13 | Fire Extinguisher Status |
| 4 | Directional Gyro | 14 | Ammeter |
| 5 | Airspeed Indicator | 15 | Fuel Level |
| 6 | Turn & Bank Indicator | 16 | Internal System Indicator |
| 7 | Variometer | 17 | Internal System Indicator |
| 8 | Prop Pitch Indicator | 18 | Pump Pressure |
| 9 | Oil Pressure; Fuel Pressure | 19 | Air Pressure |
| 10 | Oil Temperature | 20 | Brake Pressure |

(IAR 80 continued)

At a Glance:

Engine:

I.A.R. K.14-1000A.

Power: 1,025 HP

Armament:

- 4 x 7.62 mm (FN).
- 2 x 20 mm (MG 151).
- Up to 250 kg of bombs.

Advantages:

- Excellent performance characteristics;
- Excellent maneuverability;
- Strong armament;
- Good cockpit visibility;
- Easy to fly.

Disadvantages:

- Low speed.

J2M3



Type: Fighter

Major Users: Japan

Cockpit Guide:



- | | |
|-------------------------------------|------------------------------|
| 1 Turn & Bank Indicator | 14 RPM Indicator |
| 2 Artificial Horizon | 15 Fuel Level |
| 3 Variometer | 16 Cylinder Head Temperature |
| 4 Flap Position Indicator | 17 Manifold Pressure |
| 5 Compass | 18 ADI Quantity |
| 6 Airspeed Indicator | 19 Oil Temperature |
| 7 Altimeter | 20 Oil Pressure |
| 8 Landing Gear Indicator Lights | 21 Fuel Level |
| 9 Fire Extinguisher Level | 22 ADI Pressure |
| 10 Oxygen Pressure; Oxygen Quantity | 23 Magneto Switch |
| 11 Hydraulic Pressure | 24 Fuel Pressure |
| 12 Free Air Temperature | 25 Clock |
| 13 Exhaust Temperature | 26 Voltmeter / Ammeter |

(J2M continued)

At a Glance:

Engine:

MK4R-A Kasei 23a

Power: 1,800 HP (take-off)

Armament:

- 2 x Type 99 model 1 20mm cannon
- 2 x Type 99 model 2 20mm cannon
- 2 x 60kg bombs

Advantages:

- High Speed;
- Good performance at all altitudes;
- Powerful Armament.

Disadvantages:

- Poor rearward visibility;
- Low ammo load.

Pilot Notes:

- The aircraft is equipped with a three-stage supercharger.
- Supercharger Stage 1 (default) should be used between 0 and 3,000 meters
- Supercharger Stage 2 should be used between 3,000 and 5,500 meters
- Supercharger Stage 3 should be used above 5,500 meters
- Mixture adjustment is required at 6,000 meters.

J2M5



Type: Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|----------------------------------|----|---------------------------|
| 1 | Turn & Bank Indicator | 14 | RPM Indicator |
| 2 | Artificial Horizon | 15 | Fuel Level |
| 3 | Variometer | 16 | Cylinder Head Temperature |
| 4 | Flap Position Indicator | 17 | Manifold Pressure |
| 5 | Compass | 18 | ADI Quantity |
| 6 | Airspeed Indicator | 19 | Oil Temperature |
| 7 | Altimeter | 20 | Oil Pressure |
| 8 | Landing Gear Indicator Lights | 21 | Fuel Level |
| 9 | Fire Extinguisher Level | 22 | ADI Pressure |
| 10 | Oxygen Pressure; Oxygen Quantity | 23 | Magneto Switch |
| 11 | Hydraulic Pressure | 24 | Fuel Pressure |
| 12 | Free Air Temperature | 25 | Clock |
| 13 | Exhaust Temperature | 26 | Voltmeter / Ammeter |

(J2M continued)

At a Glance:

Engine:

1 x MK4U-4 Kasei 26a

Power: 1,820 HP for take-off

1,510 HP at 2,800 m

Armament:

- 4 x 20 mm Type 99 Model 2 cannon
- Up to 60 kg of bombs
- 2 x 200 l drop tanks

Advantages:

- High Speed;
- Good performance at all altitudes;
- Powerful Armament.

Disadvantages:

- Poor rearward visibility;
- Low ammo load.

Pilot Notes:

- The aircraft is equipped with a three-stage supercharger.
- Supercharger Stage 1 (default) should be used between 0 and 3,000 meters
- Supercharger Stage 2 should be used between 3,000 and 5,500 meters
- Supercharger Stage 3 should be used above 5,500 meters
- Mixture adjustment is required at 6,000 meters.

J8A (Gladiator)



Type: Fighter

Major Users: Finland; RAF

Cockpit Guide:



- | | | | |
|---|---------------------------|----|------------------------------------|
| 1 | Variometer | 10 | Altimeter |
| 2 | Vacuum Regulator | 11 | Oil Temperature |
| 3 | Oxygen Altitude | 12 | Oil Pressure |
| 4 | Oxygen Quantity | 13 | Manifold Pressure |
| 5 | RPM Indicator | 14 | Fuel Level |
| 6 | Variometer | 15 | Oil Temp & Pressure; Fuel Pressure |
| 7 | Airspeed Indicator | 16 | Clock |
| 8 | System Switch | 17 | Compass |
| 9 | Turn & Bank Indicator | | |

(J8A continued)

At a Glance:

Engine:

1 x Mercury I

Power: 840 HP

Advantages:

- Good maneuverability;
- Adequate early-war armament;
- Enclosed cockpit.

Armament:

- 4 x.303 machine guns

Disadvantages:

- Obsolete biplane design;
- Low speed.

Ju-87B-2



Type: Dive Bomber

Major Users: Germany

Cockpit Guide:



- | | | | |
|---|---------------------------|----|-----------------------------|
| 1 | Altimeter | 9 | Clock |
| 2 | Directional Gyro | 10 | Compass |
| 3 | Airspeed Indicator | 11 | RPM Indicator |
| 4 | Altimeter | 12 | Manifold Pressure |
| 5 | Turn & Bank Indicator | 13 | Fuel Level |
| 6 | Variometer | 14 | Fuel Pressure; Oil Pressure |
| 7 | Ammeter | 15 | Coolant Temperature |
| 8 | Instrument Dimmer Switch | 16 | Oil Temperature |

(Ju-87 continued)

Other Playable Crew Positions:



Rear Gunner

At a Glance:

Engine:

1 x Ju 211D.

Power:

Take-off : 1,200 HP

Armament:

- 2 x 7.9 mm (MG 17).
- 1 x 7.9 mm (MG 15).
- Up to 500 kg of bombs

Advantages:

- Good flight characteristics;
- Good maneuverability;
- Good cockpit visibility;
- Reliable and easy to maintain;
- Easy to fly.

Disadvantages:

- Weak defensive armament.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,650 RPM

Best Cruise: 2,200 RPM

Economy Cruise: 2,050 RPM

Prop Pitch Control: Manual

Mixture Control: No

Boost: No

Supercharger: Two Speed

- Ju-87 Stuka is the most famous dive bomber in the world, and quite likely the most widely recognizable symbol of WWII. It is however not as glamorous as it may seem. It's slow, rather vulnerable and does not have much offensive power. However it is an excellent dive bomber and in capable hands every diving attack will result in a kill.
- The standard way to dive bomb is to sight the target through the floor window, drop dive brakes, chop throttle and roll over to inverted position. After that place the target in your crosshairs and release the bombs at minimum of 500 meters of altitude. Retract the dive brake, throttle up and head home. Ju-87's two rifle-caliber machine guns are barely adequate for strafing soft targets, but in areas protected by flak and especially enemy fighters a Ju-87 will not last long.
- When you do have an enemy fighter on your tail, Ju-87 will prove surprisingly maneuverable at low speeds. Late Soviet fighters can't even fly as slow as the Ju-87 near stall speed. You won't be able to clearly outmaneuver most fighters, but you should be easily able to avoid their passes, and constantly keep them in your rear gunner's field of fire.

Ju-87D-3



Type: Dive Bomber

Major Users: Germany

Cockpit Guide:



- 1 **Altimeter**
- 2 **Directional Gyro**
- 3 **Airspeed Indicator**
- 4 **Altimeter**
- 5 **Turn & Bank Indicator**
- 6 **Variometer**
- 7 **Ammeter**
- 8 **Clock**
- 9 **Compass**
- 10 **Instrument Dimmer Switch**

- 11 **RPM Indicator**
- 12 **Manifold Pressure**
- 13 **Fuel Level**
- 14 **Fuel Pressure; Oil Pressure**
- 15 **Coolant Temperature**
- 16 **Oil Temperature**
- 17 **Ammunition Counters**
- 18 **Brake Pressure**
- 19 **Air Pressure**

(Ju-87 continued)

Other Playable Crew Positions:



Rear Gunner

At a Glance:

Engine:

1 x Ju 211J.

Power:

Take-off : 1,400 HP

Armament:

- 2 x 7.9 mm (MG 17).
- 1 x 7.9 mm (MG 15).
- Up to 1,000 kg of bombs

Advantages:

- Good flight characteristics;
- Good maneuverability;
- Good cockpit visibility;
- Reliable and easy to maintain;
- Easy to fly.

Disadvantages:

- Weak defensive armament.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,650 RPM

Best Cruise: 2,200 RPM

Economy Cruise: 2,050 RPM

Prop Pitch Control: Manual

Mixture Control: No

Boost: No

Supercharger: Two Speed

- Ju-87 Stuka is the most famous dive bomber in the world, and quite likely the most widely recognizable symbol of WWII. It is however not as glamorous as it may seem. It's slow, rather vulnerable and does not have much offensive power. However it is an excellent dive bomber and in capable hands every diving attack will result in a kill.
- The standard way to dive bomb is to sight the target through the floor window, drop dive brakes, chop throttle and roll over to inverted position. After that place the target in your crosshairs and release the bombs at minimum of 500 meters of altitude. Retract the dive brake, throttle up and head home. Ju-87's two rifle-caliber machine guns are barely adequate for strafing soft targets, but in areas protected by flak and especially enemy fighters a Ju-87 will not last long.
- When you do have an enemy fighter on your tail, Ju-87 will prove surprisingly maneuverable at low speeds. Late Soviet fighters can't even fly as slow as the Ju-87 near stall speed. You won't be able to clearly outmaneuver most fighters, but you should be easily able to avoid their passes, and constantly keep them in your rear gunner's field of fire.

Ju-87D-5



Type: Dive Bomber

Major Users: Germany

Cockpit Guide:



- 1 **Altimeter**
- 2 **Directional Gyro**
- 3 **Airspeed Indicator**
- 4 **Altimeter**
- 5 **Turn & Bank Indicator**
- 6 **Variometer**
- 7 **Ammeter**
- 8 **Clock**
- 9 **Compass**
- 10 **Instrument Dimmer Switch**

- 11 **RPM Indicator**
- 12 **Manifold Pressure**
- 13 **Fuel Level**
- 14 **Fuel Pressure; Oil Pressure**
- 15 **Coolant Temperature**
- 16 **Oil Temperature**
- 17 **Ammunition Counters**
- 18 **Brake Pressure**
- 19 **Air Pressure**

(Ju-87 continued)

Other Playable Crew Positions:



Rear Gunner

At a Glance:

Engine:

1 x Ju 211J.

Power:

Take-off : 1,400 HP

Armament:

- 2 x 20 mm (MG 151/20).
- 2 x 7.9 mm (MG 15).
- Up to 1,000 kg of bombs

Advantages:

- Good flight characteristics;
- Good maneuverability;
- Good cockpit visibility;
- Reliable and easy to maintain;
- Easy to fly.

Disadvantages:

- Weak defensive armament.

Pilot Notes:

Take-Off Speed: 160 km/h

Landing Speed: 155 km/h

Combat Engine Setting: 2,650 RPM

Best Cruise: 2,200 RPM

Economy Cruise: 2,050 RPM

Prop Pitch Control: Manual

Mixture Control: No

Boost: No

Supercharger: Two Speed

- Ju-87 Stuka is the most famous dive bomber in the world, and quite likely the most widely recognizable symbol of WWII. It is however not as glamorous as it may seem. It's slow, rather vulnerable and does not have much offensive power. However it is an excellent dive bomber and in capable hands every diving attack will result in a kill.
- The standard way to dive bomb is to sight the target through the floor window, drop dive brakes, chop throttle and roll over to inverted position. After that place the target in your crosshairs and release the bombs at minimum of 500 meters of altitude. Retract the dive brake, throttle up and head home. Ju-87's two rifle-caliber machine guns are barely adequate for strafing soft targets, but in areas protected by flak and especially enemy fighters a Ju-87 will not last long.
- When you do have an enemy fighter on your tail, Ju-87 will prove surprisingly maneuverable at low speeds. Late Soviet fighters can't even fly as slow as the Ju-87 near stall speed. You won't be able to outmaneuver most fighters, but you should be able to avoid their passes, and constantly keep them in your rear gunner's field of fire.
- The Stuka D-5 is equipped with the Stuvi dive sight. Before the dive in your Ju-87D-5 you must set your dive airspeed (true) by buttons "Increase Sight Velocity" and "Decrease Sight Velocity" and bomb drop altitude by buttons "Increase Sight Altitude" and "Decrease Sight Altitude". When the plane enters the dive you must place the crosshairs onto your target and keep it there. When the plane reaches the preset altitude the warning horn will sound. The pilot should drop the bombs at this point, after which point the plane will be automatically leveled off.

Ju-87G-1



Type: Dive Bomber / Ground Attack

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|---------------------------|----|-----------------------------|
| 1 | Altimeter | 11 | RPM Indicator |
| 2 | Directional Gyro | 12 | Manifold Pressure |
| 3 | Airspeed Indicator | 13 | Fuel Level |
| 4 | Altimeter | 14 | Fuel Pressure; Oil Pressure |
| 5 | Turn & Bank Indicator | 15 | Coolant Temperature |
| 6 | Variometer | 16 | Oil Temperature |
| 7 | Ammeter | 17 | Ammunition Counters |
| 8 | Clock | 18 | Brake Pressure |
| 9 | Compass | 19 | Air Pressure |
| 10 | Instrument Dimmer Switch | | |

(Ju-87 continued)

Other Playable Crew Positions:



Rear Gunner

At a Glance:

Engine:

1 x Ju 211J.

Power:

Take-off : 1,400 HP

Armament:

- 2 x 37 mm (VK 3.7).
- 2 x 7.9 mm (MG 15).
- Up to 1,000 kg of bombs

Advantages:

- Good flight characteristics;
- Good cockpit visibility;
- Reliable and easy to maintain;
- Easy to fly.

Disadvantages:

- Poor maneuverability;
- Low speed;
- Weak defensive armament.

Pilot Notes:

Take-Off Speed: 170 km/h

Landing Speed: 160 km/h

Combat Engine Setting: 2,650 RPM

Best Cruise: 2,200 RPM

Economy Cruise: 2,050 RPM

Prop Pitch Control: Manual

Mixture Control: No

Boost: No

Supercharger: Two Speed

- Ju-87G looks like a Stuka, sounds like a Stuka and flies like a Stuka – however it's anything but. Instead of bombs the Ju-87 G is equipped with two 37mm gunpods under the wings specifically designed to destroy enemy tanks. A single shot at the enemy tank's rear will crack it open. Ju-87G is slower and much less maneuverable than a regular Stuka, therefore you should try to stay at low levels to avoid enemy flak and fighters.
- Attacks are best initiated from 500 meters or so, in 15-45 degree dives. Remember that the cannons are located under your wings, therefore convergence becomes very important when firing at small targets like tanks. When firing outside convergence range your rounds are very likely to impact near the tank on both sides without hitting it.
- When attacked by enemy fighters the rear gunner is the best defense. Dive to ground level and maneuver to keep the enemy fighter within the rear gunner's defensive arc.
- If you can cause the enemy to overshoot, or extend and attacking head-on your 37mms should bring an end to any Soviet fighter.

Ju-88A-4



Type: Bomber

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|-------------------------------|----|--|
| 1 | Homing Beacon Indicator | 16 | Manifold Pressure (Engine #1) |
| 2 | Variometer | 17 | Manifold Pressure (Engine #2) |
| 3 | Turn & Bank Indicator | 18 | RPM Indicator (Engine #1) |
| 4 | Artificial Horizon | 19 | RPM Indicator (Engine #2) |
| 5 | Compass | 20 | Oil Pressure; Fuel Pressure (Engine 1-2) |
| 6 | Bank Indicator | 21 | Coolant Temperature (Engine #1) |
| 7 | Directional Gyro | 22 | Coolant Temperature (Engine #2) |
| 8 | Airspeed Indicator | 23 | Internal System Indicator |
| 9 | Altimeter | 24 | Internal System Indicator |
| 10 | Pilot's Direction Indicator | 25 | Fuel Level |
| 11 | Altimeter | 26 | Fuel Selector Switch |
| 12 | Fuel Pressure | 27 | Fuel Level |
| 13 | Landing Gear Indicator Lights | 28 | Free Air Temperature |
| 14 | Clock | 29 | TAS Selector Switch |
| 15 | Directional Gyro | 30 | True Airspeed Indicator |

(Ju-88 continued)

Other Playable Crew Positions:



Bombardier



Nose Gunner



Top Gunner



Bottom Gunner

At a Glance:

Engine:

2 x Jumo 211B-1.

Power: 1,200 HP

Armament:

- 1 x 7.9 mm (MG 81): front.
- 1 x 7.9 mm (MG 81Z): bottom.
- 2 x 7.9 mm (MG 81): top.
- Up to 1,000 kg of bombs.

Advantages:

- Good flight performance;
- High maneuverability and good armament;
- Multifunctional;
- Excellent cockpit visibility;
- Dive autopilot.

Disadvantages:

- Insufficient defensive armament;
- Entire crew sharing small quarters makes them easy to disable.

(Ju-88 continued)

Using the Dive Sight:

- The Ju-88 is equipped with the Stuvi dive sight. Before the dive you must set your dive airspeed (true) with the "*Increase Sight Velocity*" and "*Decrease Sight Velocity*" keys, and bomb drop altitude with the "*Increase Sight Altitude*" and "*Decrease Sight Altitude*" keys.
- These are the actual instructions from the historical *Fl Üb 8-179/4* manual. (Traditional method with "Dive Automation")
 - 1. Close radiator.
 - 2. Set propeller pitch to 100% (Auto).
 - 3. Set bombsight speed to estimated drop speed (can be adjusted during dive).
 - 4. Set bombsight altitude (for example 1000m).
 - 5. Center trim (on Ju88 red marks).
 - 6. Extend the dive brake (this will also trim plane to dive).
 - 7. Set power to idle (0%).
 - 8. Take aim with ring in top part of the sight. Also take note of the dive bombing marker ("Krawatte") below the ring on the vertical line.
 - 9. Hold target in the ring until you hear the drop altitude warning buzzer.
 - 10. Pull up so that the dive bombing marker becomes superimposed on the target. Hold steady for a moment.
 - 11. Press the bomb release button (this will also initiate the pull-out by centering the trim again).
 - 12. Press the dive-brake button again to raise the brakes up.
 - 13. Apply power slowly to avoid overspeeding the engines.
 - 14. Open the radiator and adjust prop pitch for cruise, if necessary.

Using the Level Sight:

- The level bomb sight will automatically calculate the bomb trajectory and impact point based on the aircraft's current airspeed and altitude. The bombardier must enter these parameters into the sight manually, and point it at the target. Then the sight will automatically track the target, and drop the bombs automatically at the right time.
- As the first step, bombing altitude and aircraft speed must be entered into the bombsight. The actual altitude above target (not above sea level) can be entered using the *Increase Bombsight Altitude* and *Decrease Bombsight Altitude* keys. The plane speed is entered using the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys. Note that the true (not indicated) airspeed must be set. It can be obtained from the speed gauge when in No-Cockpit View mode.
- After the initial parameters are entered, the bombardier has to acquire the target with the bombsight crosshair. Tap the *Toggle Gunsight* key (Shift-F1 by default) to look through the optics. Use *Increase Bombsight Distance* and *Decrease Bombsight Distance* to adjust the bombsight viewing angle up, and scan the horizon for the mission target.
- If the target does not appear along the centerline of the bomb sight optics, make minute changes to your plane's course. Then using the *Increase Bombsight Distance* and *Decrease Bombsight Distance* keys place the crosshair on target. With the target dead center, turn on the targeting computer using the *Toggle Bombsight Automation* key. The bombsight will begin tracking the target. Correct the crosshair movement with the *Increase Bombsight Velocity* and *Decrease Bombsight Velocity* keys if necessary.
- The bombs will drop automatically when the plane reaches the proper position for a bomb drop, based on the input parameters and the optics angle.
- Note that after starting the bomb run, a plane may not be banked more than 4.5 degrees or the bombsight will lose stability. Only slight adjustments in direction are allowed. After more substantial maneuvers the bomb sight may take up to 30 seconds to stabilize. During the stabilization phase, the bomb sight crosshairs are turned off.

Ki-27 Ko



Type: Fighter

Major Users: Japan

Cockpit Guide:



- 1 **Airspeed Indicator**
- 2 **Turn & Bank Indicator**
- 3 **Variometer**
- 4 **RPM Indicator**
- 5 **Manifold Pressure**
- 6 **Compass**
- 7 **Altimeter**

- 8 **Oil Pressure**
- 9 **Oil Temperature**
- 10 **Fuel Pressure**
- 11 **Coolant Temperature**
- 12 **Clock**
- 13 **Fuel Level**

(Ki-27 continued)

At a Glance:

Engine:

Army Type 97 (Ha-1b)

Power: 780 HP at 2,900 m

Armament:

- 2 x 7.7mm Type 89
- Up to 100 kg of bombs
- 2 x 130 k drop tanks

Advantages:

- Excellent maneuverability.

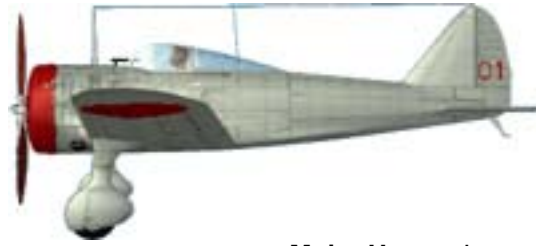
Disadvantages:

- Light armament;
- Low top speed;
- Poor pilot protection.

Pilot Notes:

- The aircraft is equipped with a single-step supercharger, therefore no pilot intervention is needed.
- Mixture adjustment is required at 6,000 meters.

Ki-27 Otsu



Type: Fighter

Major Users: Japan

Cockpit Guide:



- 1** ***Airspeed Indicator***
- 2** ***Turn & Bank Indicator***
- 3** ***Variometer***
- 4** ***RPM Indicator***
- 5** ***Manifold Pressure***
- 6** ***Compass***
- 7** ***Altimeter***

- 8** ***Oil Pressure***
- 9** ***Oil Temperature***
- 10** ***Fuel Pressure***
- 11** ***Coolant Temperature***
- 12** ***Clock***
- 13** ***Fuel Level***

(Ki-27 continued)

At a Glance:

Engine:

Army Type 97 (Ha-1b)

Power: 780 HP at 2,900 m

Armament:

- 2 x 7.7mm Type 89
- Up to 100 kg of bombs
- 2 x 130 k drop tanks

Advantages:

- Excellent maneuverability.

Disadvantages:

- Light armament;
- Low top speed;
- Poor pilot protection.

Pilot Notes:

- The aircraft is equipped with a single-step supercharger, therefore no pilot intervention is needed.
- Mixture adjustment is required at 6,000 meters.

Ki-43-Ia



Type: Fighter

Major Users: Japan

Cockpit Guide:



- 1 **Airspeed Indicator**
- 2 **Turn & Bank Indicator**
- 3 **Variometer**
- 4 **Manifold Pressure**
- 5 **Compass**
- 6 **Altimeter**
- 7 **RPM Indicator**

- 8 **Fuel Pressure**
- 9 **Oil Pressure**
- 10 **Oil Temperature**
- 11 **Landing Gear Indicator Lights**
- 12 **Cylinder Head Temperature**
- 13 **Exhaust Temperature**
- 14 **Ammeter**

At a Glance:

Engine:

1 x Army Type 99

Power: 950 HP

Advantages:

- Excellent maneuverability;
- Easy to fly.

Armament:

- 2 x Type 89 7.7mm machine guns
- 30 kg of bombs

Disadvantages:

- Low speed;
- Weak armament.

Ki-43-Ib



Type: Fighter

Major Users: Japan

Cockpit Guide:



- 1 **Airspeed Indicator**
- 2 **Turn & Bank Indicator**
- 3 **Variometer**
- 4 **Manifold Pressure**
- 5 **Compass**
- 6 **Altimeter**
- 7 **RPM Indicator**

- 8 **Fuel Pressure**
- 9 **Oil Pressure**
- 10 **Oil Temperature**
- 11 **Landing Gear Indicator Lights**
- 12 **Cylinder Head Temperature**
- 13 **Exhaust Temperature**
- 14 **Ammeter**

At a Glance:

Engine:

1 x Army Type 99

Power: 950 HP

Armament:

- 1 x 7.7mm Type 89
- 1 x 12.7mm Type 1
- 30 kg of bombs

Advantages:

- Excellent maneuverability;
- Easy to fly.

Disadvantages:

- Low speed;
- Weak armament.

Ki-43-Ic



Type: Fighter

Major Users: Japan

Cockpit Guide:



- 1 **Airspeed Indicator**
- 2 **Turn & Bank Indicator**
- 3 **Variometer**
- 4 **Manifold Pressure**
- 5 **Compass**
- 6 **Altimeter**
- 7 **RPM Indicator**

- 8 **Fuel Pressure**
- 9 **Oil Pressure**
- 10 **Oil Temperature**
- 11 **Landing Gear Indicator Lights**
- 12 **Cylinder Head Temperature**
- 13 **Exhaust Temperature**
- 14 **Ammeter**

At a Glance:

Engine:

1 x Army Type 99

Power: 950 HP

Advantages:

- Excellent maneuverability;
- Easy to fly.

Armament:

- 2 x 12.7mm Type 1
- 30 kg of bombs

Disadvantages:

- Low speed;
- Weak armament.

Ki-43-II



Type: Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|---------------------------|----|-------------------------------|
| 1 | Airspeed Indicator | 12 | Oxygen Indicator |
| 2 | Turn & Bank Indicator | 13 | Cylinder Head Temperature |
| 3 | Variometer | 14 | Exhaust Temperature |
| 4 | Manifold Pressure | 15 | Gun Pressure |
| 5 | Compass | 16 | Landing Gear Indicator Lights |
| 6 | Altimeter | 17 | Oxygen Flow Indicator |
| 7 | RPM Indicator | 18 | Oxygen Pressure |
| 8 | Oil Pressure | 19 | Hydraulic Pressure |
| 9 | Fuel Pressure | 20 | Radio |
| 10 | Oil Temperature | 21 | Fuel Level (Front) |
| 11 | Clock | 22 | Fuel Level (Rear) |
| | | 23 | |

(Ki-43 continued)

At a Glance:

Engine:

1 x Ha-115

Power: 1,150 HP

Advantages:

- Excellent maneuverability;
- Easy to fly.

Armament:

- 2 x 12.7mm Type 1
- Up to 500 kg of bombs

Disadvantages:

- Low speed;
- Weak armament.

Ki-43-II Kai



Type: Fighter

Major Users: Japan

Cockpit Guide:



- 1 **Airspeed Indicator**
- 2 **Turn & Bank Indicator**
- 3 **Variometer**
- 4 **Manifold Pressure**
- 5 **Compass**
- 6 **Altimeter**
- 7 **RPM Indicator**
- 8 **Oil Pressure**
- 9 **Fuel Pressure**
- 10 **Oil Temperature**
- 11 **Clock**

- 12 **Oxygen Indicator**
- 13 **Cylinder Head Temperature**
- 14 **Exhaust Temperature**
- 15 **Gun Pressure**
- 16 **Landing Gear Indicator Lights**
- 17 **Oxygen Flow Indicator**
- 18 **Oxygen Pressure**
- 19 **Hydraulic Pressure**
- 20 **Radio**
- 21 **Fuel Level (Front)**
- 22 **Fuel Level (Rear)**

(Ki-43 continued)

At a Glance:

Engine:

1 x Ha-115

Power: 1,150 HP

Advantages:

- Excellent maneuverability;
- Easy to fly.

Armament:

- 2 x 12.7mm Type 1
- Up to 500 kg of bombs

Disadvantages:

- Low speed;
- Weak armament.

Ki-61-I Hei



Type: Fighter

Major Users: Japan

Cockpit Guide:



- 1 Turn & Bank Indicator
- 2 Variometer
- 3 **Airspeed Indicator**
- 4 **Compass**
- 5 **Altimeter**
- 6 Clock
- 7 Free Air Temperature
- 8 Magneto Switch
- 9 Manifold Pressure
- 10 Exhaust Temperature

- 11 RPM Indicator
- 12 Coolant Temperature
- 13 Oil Temperature
- 14 Oil Pressure
- 15 Fuel Pressure
- 16 Landing Gear Indicator Lights
- 17 Oxygen Quantity
- 18 Oxygen Pressure
- 19 **Fuel Level**
- 20 Ammeter

(Ki-61 continued)

At a Glance:

Engine:

1 x Ha-40

Power: 1,175 HP (take-off)

1,080 HP (at 4,200 m – 13,780 ft)

Advantages:

- Good performance compared to early to mid-war aircraft;
- Adequate armament.

Armament:

- 2 x Type 1 12.7mm machine guns
- 2 x Type 89 7.7mm machine guns

Disadvantages:

- Outclassed by late war Allied fighters.

Ki-61-I Ko



Type: Fighter

Major Users: Japan

Cockpit Guide:



- 1 Turn & Bank Indicator
- 2 Variometer
- 3 **Airspeed Indicator**
- 4 **Compass**
- 5 **Altimeter**
- 6 Clock
- 7 Free Air Temperature
- 8 Magneto Switch
- 9 Manifold Pressure
- 10 Exhaust Temperature

- 11 RPM Indicator
- 12 Coolant Temperature
- 13 Oil Temperature
- 14 Oil Pressure
- 15 Fuel Pressure
- 16 Landing Gear Indicator Lights
- 17 Oxygen Quantity
- 18 Oxygen Pressure
- 19 **Fuel Level**
- 20 Ammeter

(Ki-61 continued)

At a Glance:

Engine:

1 x Ha-40

Power: 1,175 HP (take-off)

1,080 HP (at 4,200 m – 13,780 ft)

Armament:

- 4 x Type 1 12.7mm machine guns

Advantages:

- Good performance compared to early to mid-war aircraft;
- Adequate armament.

Disadvantages:

- Outclassed by late war Allied fighters.

Ki-61-I Otsu



Type: Fighter

Major Users: Japan

Cockpit Guide:



- 1 Turn & Bank Indicator
- 2 Variometer
- 3 **Airspeed Indicator**
- 4 **Compass**
- 5 **Altimeter**
- 6 Clock
- 7 Free Air Temperature
- 8 Magneto Switch
- 9 Manifold Pressure
- 10 Exhaust Temperature

- 11 RPM Indicator
- 12 Coolant Temperature
- 13 Oil Temperature
- 14 Oil Pressure
- 15 Fuel Pressure
- 16 Landing Gear Indicator Lights
- 17 Oxygen Quantity
- 18 Oxygen Pressure
- 19 **Fuel Level**
- 20 Ammeter

(Ki-61 continued)

At a Glance:

Engine:

1 x Ha-40

Power: 1,175 HP (take-off)

1,080 HP (at 4,200 m – 13,780 ft)

Armament:

- 4 x Type 1 12.7mm machine guns

Advantages:

- Good performance compared to early to mid-war aircraft;
- Adequate armament.

Disadvantages:

- Outclassed by late war Allied fighters.

Ki-84-Ia



Type: Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|----------------------------|----|---------------------------------------|
| 1 | Turn & Bank Indicator | 11 | Ignition Switch |
| 2 | Artificial Horizon | 12 | Landing Gear Indicator Lights |
| 3 | Variometer | 13 | Cylinder Head Temperature |
| 4 | Airspeed Indicator | 14 | Exhaust Temperature |
| 5 | Compass | 15 | Oil Temperature |
| 6 | Altimeter | 16 | Oil Pressure |
| 7 | RPM Indicator | 17 | Fuel Pressure |
| 8 | Manifold Pressure | 18 | Methanol Injection Pressure |
| 9 | Clock | 19 | Fuel Level & Warning Light |
| 10 | Prop Speed Selector Switch | 20 | Ammeter |

(Ki-84 continued)

At a Glance:

Engine:

1 x Ha-45-21

Power:

Take-off: 1,970 HP

Armament:

- 2 x 12.7-mm Ho 103 machine guns
- 2 x 20-mm Ho 5 cannon
- 2 x 250 kg bombs

Advantages:

- Excellent armament for a Japanese fighter;
- Excellent climb rate and maneuverability.

Disadvantages:

- Poor control on taxiing;
- Lack of fire extinguisher or emergency canopy jettison.

Pilot Notes:

- Switch supercharger speeds at 2,500 meters (8,200 feet)

Ki-84-Ib



Type: Fighter-Bomber

Major Users: Japan

Cockpit Guide:



- 1 Turn & Bank Indicator
- 2 Artificial Horizon
- 3 Variometer
- 4 **Airspeed Indicator**
- 5 **Compass**
- 6 **Altimeter**
- 7 RPM Indicator
- 8 Clock
- 9 Manifold Pressure
- 10 Cylinder Head Temperature

- 11 Exhaust Temperature
- 12 Oil Temperature
- 13 Fuel Pressure
- 14 Methanol Injection Pressure
- 15 Oil Pressure
- 16 Prop Speed Selector Switch
- 17 Ignition Switch
- 18 Landing Gear Indicator Lights
- 19 **Fuel Level & Warning Light**
- 20 Ammeter

(Ki-84 continued)

At a Glance:

Engine:

1 x Ha-45-21

Power:

Take-off: 1,970 HP

Armament:

- 4 x 20-mm cannon
- 2 x 250 kg bombs

Advantages:

- Excellent armament for a Japanese fighter;
- Excellent climb rate and maneuverability.

Disadvantages:

- Poor control on taxiing;
- Lack of fire extinguisher or emergency canopy jettison.

Pilot Notes:

- Switch supercharger speeds at 2,500 meters (8,200 feet)

Ki-84-Ic



Type: Fighter-Bomber

Major Users: Japan

Cockpit Guide:



- 1 Turn & Bank Indicator
- 2 Artificial Horizon
- 3 Variometer
- 4 **Airspeed Indicator**
- 5 **Compass**
- 6 **Altimeter**
- 7 RPM Indicator
- 8 Clock
- 9 Manifold Pressure
- 10 Cylinder Head Temperature

- 11 Exhaust Temperature
- 12 Oil Temperature
- 13 Fuel Pressure
- 14 Methanol Injection Pressure
- 15 Oil Pressure
- 16 Prop Speed Selector Switch
- 17 Ignition Switch
- 18 Landing Gear Indicator Lights
- 19 **Fuel Level & Warning Light**
- 20 Ammeter

(Ki-84 continued)

At a Glance:

Engine:

1 x Ha-45-21

Power:

Take-off: 1,970 HP

Armament:

- 2 x 20-mm Ho 5 cannon
- 2 x 30-mm Ho-105 cannon
- 2 x 250 kg bombs

Advantages:

- Excellent armament for a Japanese fighter;
- Excellent climb rate and maneuverability.

Disadvantages:

- Poor control on taxiing;
- Lack of fire extinguisher or emergency canopy jettison;
- Use of wood in later models had a negative impact on survivability

Pilot Notes:

- Switch supercharger speeds at 2,500 meters (8,200 feet)

Ki-100-I Ko



Type: Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|-----------------------------|----|-----------------------------------|
| 1 | Variometer | 13 | Oil Temperature |
| 2 | Compass | 14 | Cylinder Head Temperature |
| 3 | Airspeed Indicator | 15 | Exhaust Temperature |
| 4 | Artificial Horizon | 16 | Clock |
| 5 | Altimeter | 17 | Landing Gear Indicator Lights |
| 6 | Manifold Pressure | 18 | Fuel Level & Warning Light |
| 7 | RPM Indicator | 19 | Fuel Selector Switch |
| 8 | Magnetos Switch | 20 | Compass |
| 9 | Methanol Injection Pressure | 21 | Oxygen Quantity |
| 10 | Turn & Bank Indicator | 22 | Oxygen Pressure |
| 11 | Fuel Pressure | 23 | Ammeter |
| 12 | Oil Pressure | 27 | |

Pilot Notes:

- Switch supercharger speeds at 3,500 – 4,000 meters

MC.200 Serie 3



Type: Fighter

Major Users: Italy

Cockpit Guide:



- 1 Turn & Bank Indicator
- 2 **Airspeed Indicator**
- 3 **Compass**
- 4 **Altimeter**
- 5 Variometer
- 6 **Airspeed Indicator**
- 7 Manifold Pressure
- 8 RPM Indicator
- 9 Fuel Pressure

- 11 Flap Position Indicator
- 12 Cylinder Head Temperature
- 13 Oil Pressure
- 14 Oil Pressure
- 15 Brake Pressure
- 17 Air Pressure
- 18 Hydraulic Pressure
- 19 **Fuel Level**

(MC.200 continued)

At a Glance:

Engine:

1 x A.74 RC.38

Power:

Take-off: 870 HP.

Armament:

- 2 x 12,7-mm 310 machine guns
- Up to 300 kg of bombs

Advantages:

- Good climb rate and maneuverability.

Disadvantages:

- Low speed due to weak engine;
- Weak Armament.

MC.202 Serie III



Type: Fighter

Major Users: Italy

Cockpit Guide:



- | | | | |
|----|---------------------------|----|------------------------------------|
| 1 | Altimeter | 13 | Coolant Temperature |
| 2 | Compass | 14 | Oil Temperature |
| 3 | Clock | 15 | Landing Gear Indicator Lights |
| 4 | Airspeed Indicator | 16 | Brake Pressure |
| 5 | Turn & Bank Indicator | 17 | Oil Pressure |
| 6 | Variometer | 18 | Air Pressure |
| 7 | Artificial Horizon | 19 | Ammunition Counter & Warning Light |
| 8 | Manifold Pressure | 20 | Ammunition Counters |
| 9 | RPM Indicator | 21 | Flaps Position Indicator |
| 10 | Oil Temperature | 22 | Oxygen Pressure |
| 11 | Fuel Pressure | 23 | Oxygen Quantity |
| 12 | Fuel Level | | |

(MC.202 continued)

At a Glance:

Engine:

RA 1000 RC41-1.

Power:

Indicated: 1,175 HP;

Advantages:

- Good flight characteristics.
- High maneuverability.
- Good cockpit visibility.
- Easy to fly.

Armament:

- 2 x 12.7 mm.

Disadvantages:

- Weak Armament.

MC.202 Serie VII



Type: Fighter

Major Users: Italy

Cockpit Guide:



- | | |
|------------------------------------|--|
| 1 Altimeter | 13 <i>Coolant Temperature</i> |
| 2 Compass | 14 <i>Oil Temperature</i> |
| 3 <i>Clock</i> | 15 <i>Landing Gear Indicator Lights</i> |
| 4 Airspeed Indicator | 16 <i>Brake Pressure</i> |
| 5 <i>Turn & Bank Indicator</i> | 17 <i>Oil Pressure</i> |
| 6 <i>Variometer</i> | 18 <i>Air Pressure</i> |
| 7 <i>Artificial Horizon</i> | 19 <i>Ammunition Counter & Warning Light</i> |
| 8 <i>Manifold Pressure</i> | 20 <i>Ammunition Counters</i> |
| 9 <i>RPM Indicator</i> | 21 <i>Flaps Position Indicator</i> |
| 10 <i>Oil Temperature</i> | 22 <i>Oxygen Pressure</i> |
| 11 <i>Fuel Pressure</i> | 23 <i>Oxygen Quantity</i> |
| 12 Fuel Level | |

(MC.202 continued)

At a Glance:

Engine:

RA 1000 RC41-1.

Power:

Indicated: 1,175 HP;

Advantages:

- Good flight characteristics.
- High maneuverability.
- Good cockpit visibility.
- Easy to fly.

Armament:

- 2 x 12.7 mm.
- 2 x 7.7 mm.

Disadvantages:

- Weak Armament.

MC.202 Serie XII



Type: Fighter

Major Users: Italy

Cockpit Guide:



- | | |
|------------------------------------|--|
| 1 Altimeter | 13 <i>Coolant Temperature</i> |
| 2 Compass | 14 <i>Oil Temperature</i> |
| 3 <i>Clock</i> | 15 <i>Landing Gear Indicator Lights</i> |
| 4 Airspeed Indicator | 16 <i>Brake Pressure</i> |
| 5 <i>Turn & Bank Indicator</i> | 17 <i>Oil Pressure</i> |
| 6 <i>Variometer</i> | 18 <i>Air Pressure</i> |
| 7 <i>Artificial Horizon</i> | 19 <i>Ammunition Counter & Warning Light</i> |
| 8 <i>Manifold Pressure</i> | 20 <i>Ammunition Counters</i> |
| 9 <i>RPM Indicator</i> | 21 <i>Flaps Position Indicator</i> |
| 10 <i>Oil Temperature</i> | 22 <i>Oxygen Pressure</i> |
| 11 <i>Fuel Pressure</i> | 23 <i>Oxygen Quantity</i> |
| 12 Fuel Level | |

(MC.202 continued)

At a Glance:

Engine:

RA 1000 RC41-1.

Power:

Indicated: 1,175 HP;

Armament:

- 2 x 12.7 mm.
- 2 x 7.7 mm.

Advantages:

- Good flight characteristics.
- High maneuverability.
- Good cockpit visibility.
- Easy to fly.

Disadvantages:

- Weak Armament.

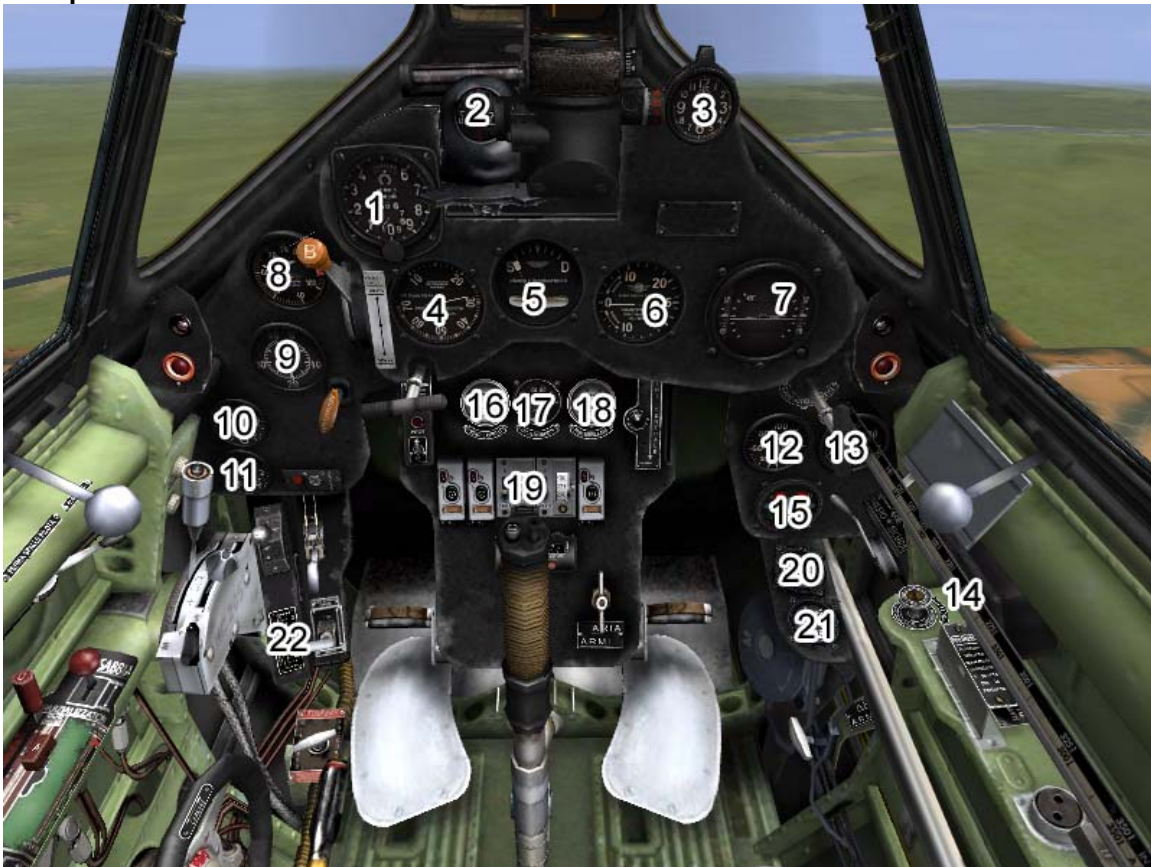
MC.205 V Serie I



Type: Fighter

Major Users: Italy

Cockpit Guide:



- | | |
|------------------------------------|---|
| 1 Altimeter | 12 <i>Coolant Temperature</i> |
| 2 Compass | 13 <i>Oil Temperature</i> |
| 3 <i>Clock</i> | 14 Fuel Level |
| 4 Airspeed Indicator | 15 <i>Landing Gear Indicator Lights</i> |
| 5 <i>Turn & Bank Indicator</i> | 16 <i>Brake Pressure</i> |
| 6 <i>Variometer</i> | 17 <i>Oil Pressure</i> |
| 7 <i>Artificial Horizon</i> | 18 <i>Air Pressure</i> |
| 8 <i>Manifold Pressure</i> | 19 <i>Ammunition Counters</i> |
| 9 <i>RPM Indicator</i> | 20 <i>Oxygen Pressure</i> |
| 10 <i>Oil Temperature</i> | 21 <i>Oxygen Quantity</i> |
| 11 <i>Fuel Pressure</i> | 22 <i>Flaps Position Indicator</i> |

(MC.205 continued)

At a Glance:

Engine:

RA1050 RC 58 Tifone

Power:

Indicated: 1,475 HP;

Armament:

- 2 x 12.7 mm MG
- 2 x 20 mm cannons
- Up to 320 kg of bombs

Advantages:

- Excellent flight characteristics at medium altitudes.
- Powerful armament
- High maneuverability.
- Good cockpit visibility.
- Easy to fly.

Disadvantages:

- Inferior performance at low and high altitudes.

MC.205 V Serie III



Type: Fighter

Major Users: Italy

Cockpit Guide:



- | | |
|------------------------------------|---|
| 1 Altimeter | 12 <i>Coolant Temperature</i> |
| 2 Compass | 13 <i>Oil Temperature</i> |
| 3 <i>Clock</i> | 14 Fuel Level |
| 4 Airspeed Indicator | 15 <i>Landing Gear Indicator Lights</i> |
| 5 <i>Turn & Bank Indicator</i> | 16 <i>Brake Pressure</i> |
| 6 <i>Variometer</i> | 17 <i>Oil Pressure</i> |
| 7 <i>Artificial Horizon</i> | 18 <i>Air Pressure</i> |
| 8 <i>Manifold Pressure</i> | 19 <i>Ammunition Counters</i> |
| 9 <i>RPM Indicator</i> | 20 <i>Oxygen Pressure</i> |
| 10 <i>Oil Temperature</i> | 21 <i>Oxygen Quantity</i> |
| 11 <i>Fuel Pressure</i> | 22 <i>Flaps Position Indicator</i> |

(MC.205 continued)

At a Glance:

Engine:

RA1050 RC 58 Tifone

Power:

Indicated: 1,475 HP;

Armament:

- 2 x 12.7 mm MG
- 2 x 20 mm cannons
- Up to 320 kg of bombs

Advantages:

- Excellent flight characteristics at medium altitudes.
- Powerful armament
- High maneuverability.
- Good cockpit visibility.
- Easy to fly.

Disadvantages:

- Inferior performance at low and high altitudes.

Me-163B-1a



Type: Rocket Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|---|--|----|-----------------------|
| 1 | Artificial Horizon | 10 | Clock |
| 2 | Ammunition Counters & Warning Lights | 11 | Thrust Indicator |
| 3 | Airspeed Indicator | 12 | Thrust Indicator |
| 4 | Artificial Horizon & Turn & Bank Indicator | 13 | Exhaust Temperature |
| 5 | Variometer | 14 | Compressor Pressure |
| 6 | Altimeter | 15 | Gear Pressure |
| 7 | RPM Indicator | 16 | Oxygen Flow Indicator |
| 8 | Fuel Level | 17 | Oxygen Pressure |
| 9 | Landing Gear Indicator Lights | 24 | |

(Me-163 continued)

At a Glance:

Engine:

1 x HWK 509A-2

Thrust: 1,700 kgc

Armament:

- 2 x 30-mm MK 108 cannons

Advantages:

- Unmatched climb rate and top speed;
- Powerful armament.

Disadvantages:

- Extremely high maintenance;
- Short range and low fuel capacity;
- Complicated aiming due to difference between own and target speeds;
- Complicated take-off and landing.

Pilot Notes:

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.

Me-262A-1a



Type: Jet Fighter

Major Users: Germany

Cockpit Guide:



- | | |
|--|---|
| 1 Airspeed Indicator | 15 Oil Pressure (Engine #2) |
| 2 Artificial Horizon & Turn & Bank Indicator | 16 Exhaust Temperature (Engine #2) |
| 3 Variometer | 17 Fuel Level Warning Light (Front) |
| 4 Altimeter | 18 Fuel Level (Front) |
| 5 Directional Gyro | 19 Fuel Level (Rear) |
| 6 Pilot's Direction Indicator | 20 Fuel Level Warning Light (Rear) |
| 7 RPM Indicator (Engine #1) | 21 Overspeed Warning Light |
| 8 RPM Indicator (Engine #2) | 22 Clock |
| 9 Exhaust Pressure (Engine #1) | 23 Cabin Pressure Warning Light |
| 10 Injection Pressure (Engine #1) | 24 Ammunition Counters & Warning Lights |
| 11 Injection Pressure (Engine #2) | 25 Air Pressure |
| 12 Exhaust Pressure (Engine #2) | 26 Landing Gear Indicator Lights |
| 13 Exhaust Temperature (Engine #1) | 27 Oxygen Pressure |
| 14 Oil Pressure (Engine #1) | 28 Oxygen Flow Indicator |

(Me-262 continued)

At a Glance:

Engine:

2 x Jumo 109-004
Thrust: 8.8 kN

Armament:

- 4 x 30 mm (MK 108) cannon

Advantages:

- Excellent performance characteristics;
- Unmatched top speed;
- Strong armament;
- Good field of vision from the cockpit;
- Multifunctional.

Disadvantages:

- Low reliability of jet engines.

Pilot Notes:

Take-Off Speed: 195 km/h

Landing Speed: 180 km/h

Prop Pitch Control: N/A

Mixture Control: No

Boost: No

Supercharger: No

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the ***Toggle Gunsight*** button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- Me-262 is one of the faster planes in the sim; however it's probably one of the most difficult to fly. Me-262's weakest point is its engines. A single rough movement of the throttle can cause your engine to cease or flame out. Be extremely gentle with the throttles and move them very slowly, constantly monitoring the RPM and engine temperature.
- Me-262 is not very maneuverable and it will lose a lot of speed in a turn. Your only advantage in combat is speed, so keep it up. Stay at least above 550 km/h when attacking enemy fighters and you should be all right.
- Me-262's armament is absolutely the most effective combination in the skies. Four 30mm MK-108s located in the nose require no convergence, and will destroy any target with a single hit. The cannons' power is enough to allow you to take pot shots at bombers beyond their defensive gunners' range. Remember that you only have 100 shells in the upper, and 80 in the lower pair of the guns. So don't waste your ammo.

Me-262A-1a U4



Type: Jet Fighter

Major Users: Germany

Cockpit Guide:



- | | |
|--|---|
| 1 Airspeed Indicator | 15 Oil Pressure (Engine #2) |
| 2 Artificial Horizon & Turn & Bank Indicator | 16 Exhaust Temperature (Engine #2) |
| 3 Variometer | 17 Fuel Level Warning Light (Front) |
| 4 Altimeter | 18 Fuel Level (Front) |
| 5 Directional Gyro | 19 Fuel Level (Rear) |
| 6 Pilot's Direction Indicator | 20 Fuel Level Warning Light (Rear) |
| 7 RPM Indicator (Engine #1) | 21 Overspeed Warning Light |
| 8 RPM Indicator (Engine #2) | 22 Clock |
| 9 Exhaust Pressure (Engine #1) | 23 Cabin Pressure Warning Light |
| 10 Injection Pressure (Engine #1) | 24 Ammunition Counters & Warning Lights |
| 11 Injection Pressure (Engine #2) | 25 Air Pressure |
| 12 Exhaust Pressure (Engine #2) | 26 Landing Gear Indicator Lights |
| 13 Exhaust Temperature (Engine #1) | 27 Oxygen Pressure |
| 14 Oil Pressure (Engine #1) | 28 Oxygen Flow Indicator |

(Me-262 continued)

At a Glance:

Engine:

2 x Jumo 109-004
Thrust: 8.8 kN

Armament:

- 1 x 50 mm cannon

Advantages:

- Excellent performance characteristics;
- Unmatched top speed;
- Devastating armament;
- Good field of vision from the cockpit;
- Multifunctional.

Disadvantages:

- Low reliability of jet engines.

Pilot Notes:

Take-Off Speed: 195 km/h

Landing Speed: 180 km/h

Prop Pitch Control: N/A

Mixture Control: No

Boost: No

Supercharger: No

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.
- Me-262 is one of the faster planes in the sim; however it's probably one of the most difficult to fly. Me-262's weakest point is its engines. A single rough movement of the throttle can cause your engine to cease or flame out. Be extremely gentle with the throttles and move them very slowly, constantly monitoring the RPM and engine temperature.
- Me-262 is not very maneuverable and it will lose a lot of speed in a turn. Your only advantage in combat is speed, so keep it up. Stay at least above 550 km/h when attacking enemy fighters and you should be all right.
- Me-262's armament is absolutely the most effective combination in the skies. Four 30mm MK-108s located in the nose require no convergence, and will destroy any target with a single hit. The cannons' power is enough to allow you to take pot shots at bombers beyond their defensive gunners' range. Remember that you only have 100 shells in the upper, and 80 in the lower pair of the guns. So don't waste your ammo.

Me-262A-2a



Type: Jet Fighter-Bomber

Major Users: Germany

Cockpit Guide:



- | | |
|--|---|
| 1 Airspeed Indicator | 15 Oil Pressure (Engine #2) |
| 2 Artificial Horizon & Turn & Bank Indicator | 16 Exhaust Temperature (Engine #2) |
| 3 Variometer | 17 Fuel Level Warning Light (Front) |
| 4 Altimeter | 18 Fuel Level (Front) |
| 5 Directional Gyro | 19 Fuel Level (Rear) |
| 6 Pilot's Direction Indicator | 20 Fuel Level Warning Light (Rear) |
| 7 RPM Indicator (Engine #1) | 21 Overspeed Warning Light |
| 8 RPM Indicator (Engine #2) | 22 Clock |
| 9 Exhaust Pressure (Engine #1) | 23 Cabin Pressure Warning Light |
| 10 Injection Pressure (Engine #1) | 24 Ammunition Counters & Warning Lights |
| 11 Injection Pressure (Engine #2) | 25 Air Pressure |
| 12 Exhaust Pressure (Engine #2) | 26 Landing Gear Indicator Lights |
| 13 Exhaust Temperature (Engine #1) | 27 Oxygen Pressure |
| 14 Oil Pressure (Engine #1) | 28 Oxygen Flow Indicator |

(Me-262 continued)

At a Glance:

Engine:

2 x Jumo 109-004
Thrust: 8.8 kN

Armament:

- 2 x 30 mm (MK 108) cannon
- Up to 1,000 kg of bombs

Advantages:

- Excellent performance characteristics;
- Unmatched top speed;
- Strong armament;
- Good field of vision from the cockpit;
- Multifunctional.

Disadvantages:

- Low reliability of jet engines.

Pilot Notes:

Take-Off Speed: 195 km/h

Landing Speed: 180 km/h

Prop Pitch Control: N/A

Mixture Control: No

Boost: No

Supercharger: No

- Me-262 is one of the faster planes in the sim; however it's probably one of the most difficult to fly. Me-262's weakest point is its engines. A single rough movement of the throttle can cause your engine to cease or flame out. Be extremely gentle with the throttles and move them very slowly, constantly monitoring the RPM and engine temperature.
- Me-262 is not very maneuverable and it will lose a lot of speed in a turn. Your only advantage in combat is speed, so keep it up. Stay at least above 550 km/h when attacking enemy fighters and you should be all right.
- Me-262's armament is absolutely the most effective combination in the skies. Four 30mm MK-108s located in the nose require no convergence, and will destroy any target with a single hit. The cannons' power is enough to allow you to take pot shots at bombers beyond their defensive gunners' range. Remember that you only have 100 shells in the upper, and 80 in the lower pair of the guns. So don't waste your ammo.

Me-262HG-II



Type: Jet Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|----|--|----|--------------------------------------|
| 1 | Airspeed Indicator | 15 | Oil Pressure (Engine #2) |
| 2 | Artificial Horizon & Turn & Bank Indicator | 16 | Exhaust Temperature (Engine #2) |
| 3 | Variometer | 17 | Fuel Level Warning Light (Front) |
| 4 | Altimeter | 18 | Fuel Level (Front) |
| 5 | Directional Gyro | 19 | Fuel Level (Rear) |
| 6 | Pilot's Direction Indicator | 20 | Fuel Level Warning Light (Rear) |
| 7 | RPM Indicator (Engine #1) | 21 | Overspeed Warning Light |
| 8 | RPM Indicator (Engine #2) | 22 | Clock |
| 9 | Exhaust Pressure (Engine #1) | 23 | Cabin Pressure Warning Light |
| 10 | Injection Pressure (Engine #1) | 24 | Ammunition Counters & Warning Lights |
| 11 | Injection Pressure (Engine #2) | 25 | Air Pressure |
| 12 | Exhaust Pressure (Engine #2) | 26 | Landing Gear Indicator Lights |
| 13 | Exhaust Temperature (Engine #1) | 27 | Oxygen Pressure |
| 14 | Oil Pressure (Engine #1) | 28 | Oxygen Flow Indicator |

(Me-262 continued)

At a Glance:

Engine:

2 x Jumo 004B

Power: 2 x 900 kg/s

Armament:

- 4 x 30 mm (MK 108) cannon

Advantages:

- Capable of sub-sonic speeds
- Powerful armament

Disadvantages:

- Low maneuverability
- Unreliable engines

Pilot Notes:

- **Gunsight Note:** The gunsight in this aircraft, as in many German planes, was positioned off-center. The default internal camera position is centered, and as such the gunsight is difficult or even impossible to use. To switch to an aiming view, use the *Toggle Gunsight* button (Shift-F1 by default) that switches the view to look through the offset gunsight.

N1K2-Ja



Type: Fighter

Major Users: Japan

Cockpit Guide:



- | | | | |
|----|------------------------------------|----|--|
| 1 | <i>RPM Indicator</i> | 13 | Altimeter |
| 2 | <i>Pilot's Direction Indicator</i> | 14 | <i>Clock</i> |
| 3 | <i>Exhaust Temperature</i> | 15 | <i>Variometer</i> |
| 4 | <i>Manifold Pressure</i> | 16 | <i>Methanol Injection Pressure</i> |
| 5 | <i>Cylinder Head Temperature</i> | 17 | <i>Oxygen System indicator</i> |
| 6 | <i>Oil Pressure; Fuel Pressure</i> | 18 | Fuel Level (Fuselage) |
| 7 | <i>Oil Temperature</i> | 19 | Fuel Level (Wings) |
| 8 | <i>Turn & Bank Indicator</i> | 20 | <i>Methanol Injection Indicator Lights</i> |
| 9 | <i>Artificial Horizon</i> | 21 | <i>Landing Gear Indicator Lights</i> |
| 10 | Compass | 22 | <i>Hydraulic Pressure</i> |
| 11 | Airspeed Indicator | 23 | <i>Ammeter</i> |
| 12 | <i>Free Air Temperature</i> | | |

(N1K2 continued)

At a Glance:

Engine:

1 x NK9H Homare 21

Power: 1,990 HP for take-off

1,825 HP at 1,750 m

Armament:

- 4 x 20mm Type 99 Model 2 cannon
- 4 x machine guns
- Up to 500 kg of bombs

Advantages:

- Good forward visibility;
- Powerful armament;
- Excellent low- and medium-altitude performance.

Disadvantages:

- High wing loading;
- Inferior high-altitude performance;
- Poor rate of climb.

Pilot Notes:

- The aircraft is equipped with a two-stage supercharger.
- Supercharger Stage 1 (default) should be used between 0 and 4,000 meters
- Supercharger Stage 2 should be used above 4,000 meters
- Mixture adjustment is required at 6,000 meters.
- The N1K2 has an advanced Auto Combat Flap system. When the system was armed (Always armed in this Simulation) the Flaps will deploy to the Combat (High Lift Setting) automatically as a function of G. To prevent nuisance cycling two different G thresholds are used. Auto extension will occur at 3.5G. Auto retraction will occur when the G is relaxed to less than 2.5G. Auto flap deflection beyond Combat is not possible.
- Below the Combat Flap threshold G, Flap operation is manual.

Ta-183



Type: Jet Fighter

Major Users: Germany

Cockpit Guide:



- | | | | |
|---|--|----|-------------------------|
| 1 | Clock | 10 | Exhaust Pressure |
| 2 | Variometer | 11 | Oil Pressure |
| 3 | Airspeed Indicator | 12 | Fuel Level |
| 4 | Artificial Horizon & Turn & Bank Indicator | 13 | Ammunition Counters |
| 5 | Pilot's Direction Indicator | 14 | Free Air Temperature |
| 6 | Altimeter | 15 | Air Pressure |
| 7 | Directional Gyro | 16 | Trim Position Indicator |
| 8 | RPM Indicator | 17 | Oxygen Flow Indicator |
| 9 | Exhaust Temperature | 18 | Oxygen Pressure |

(Ta-183 continued)

At a Glance:

Engine:

1 x HeS 011

Power: 1,300 kg/s

Armament:

- 4 x MK 108 cannon

Advantages:

- High speed;
- Ease of production.

Disadvantages:

- Low-speed control problems due to wing configuration

Pilot Notes:

- A captured model of the Ta-183 was tested in the TsAGI wind tunnel post war, and immediately uncovered a fatal mistake in the design. Flutter and subsequent structural failure of the tail unit began at only 700 km/h. Therefore we've had to artificially strengthen the tail unit by a great amount, in order to allow for the design to reach specified speeds while still keeping the famous original shape.
- In reality such a redesign would have been near impossible, and most likely the tail unit would have been radically redesigned instead (such as was the case with the historical Pulqui II fighter built by Kurt Tank after the war).
- In general, the plane is modeled with several concessions that were possible to make only using the knowledge gained post the 1950s.
- The **X-4** air-to-air rocket is wire guided. All rocket-carrying aircraft have a single rocket control module, and as such can guide only one rocket at a time. When launching multiple rockets simultaneously, only the last rocket fired can be guided.
- To guide the rocket, use the "*Increase Sight Attitude*", "*Decrease Sight Attitude*", "*Adjust Sight Control to Right*" and "*Adjust Sight Control to Left*" keys. We recommend assigning them to the Up, Down, Right, and Left arrow keys correspondingly.
- The easiest way to guide the rocket to target is to fire from the target's six-o'clock level while flying on the same course. Guide the rocket to keep the lights on top of the target with no visible lateral movement until the moment of impact. Use gentle taps to provide last-minute guidance. The rockets detonate remotely, so no direct impact is required.
- This method should be used to attack non-maneuvering heavy bombers from 3,000 to 3,500 meters away.
- NOTE: The guiding wire is not visually modeled.
- Ta-183, Ta-152C, and potentially some other Luft'46 planes modeled in our sim were projected to use the EZ42 gyro sight, similar to the K-14 "ace-maker" used in late-war American planes.
- However no detailed information about the features of the EZ42 exist, and we were forced to "install" regular sights on these planes. Even in the cockpits with 3D models visually based on the EZ42 design, they function as simple reflector sights.

Acknowledgements

This document is partially based on Ilya Shevchenko's Plane Guide for Forgotten Battles, from which the comprehensive texts for some Soviet and Japanese planes are taken. We reused those texts here; however we were unable to go into the same kind of detail for all our other planes.

The Pilot Notes sections of this document also uses information from previous manuals and readmes.

Some texts taken from the FB guide or older version readmes may not have been updated to reflect most recent developments.

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And the hundreds of fans whose years of dedication combined into all the aircraft described in this guide!

Note to People who Like to Complain

The level of detail in this document is clearly uneven. Some of the planes have more info; some have less.

This is a glass-half-full situation.

The document started as a cockpit guide. Its contents were to be a diagram of each cockpit, and a name of each gauge in it.

However, as we began working on the document, it became clear that it could become much more. So we've gathered all *previously compiled information* on the planes contained herein, and included it with the guide.

We've gathered as much information as possible, and tried to make this guide as encompassing as we could. We didn't have texts and data already available, we were often able to research and gather it specifically for this guide; however in some cases we were not. So, the *At a Glance* and *Pilot's Notes* section are a bonus. Please think of them that way.